Comparatively Advantaged: Economic Diversity, Unemployment, and International Trade

by

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Theoretical models of international trade suggest that countries will specialize in the industry that affords the greatest comparative advantage. Yet, many policy makers counsel diversification as a way to insulate national economies from exogenous shocks and reduce unemployment. This paper posits a hypothesis of how international trade affects economic diversity and steady-state unemployment, based on a dynamic interpretation of Ricardian and Hecksher-Ohlin models of trade. Subsequent data analysis provides evidence supporting our supposition, suggesting that there are strong links between the degree of specialization and the long run level of unemployment. Our findings lead us to question prevailing conventional wisdom, and we suggest alternative ways small countries can enjoy the benefits of economic diversification.

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1.0 INTRODUCTION

This paper explores the relationship between economic diversity and unemployment at the individual country level, in the context of international trade. The global economy is an immensely complicated marketplace of competing multinational firms, varying trade rules, and an infinite array of goods, services, and commodities. Each country seeks to maximize its competitive advantage as it trades with other nations, specializing in whatever it is that its economy does best. Events, trends, and natural advantages in one country can have a profound impact on the economic diversification and unemployment of other nations.

In our discussion of diversification and unemployment, we will extend some findings from national/regional economics to an international economics/development setting. While this is not explicitly mentioned in competitive trade models, I suggest linkages – but my thrust is empirical, not theory or analysis, so I find justification there.

It is important to remember that this is not merely within the realm of economics. Unemployment has a vast psychological effect on the idle, and when a society is incapable of addressing the problem it can be a destabilizing force. Phenomena like the Arab Spring are driven by this kind of discontent. Thus, understanding the causes of chronic joblessness can be a critical tool for political analysis.

This paper is organized as follows: First, we establish a conceptual background for our exploration. Second, we posit a hypothesis. Third, we review the research methodology. Fourth,

we analyze our empirical results. Fifth, we outline recommendations for policy makers. Sixth, we offer concluding remarks and suggestions for further research.

2.0 THEORETICAL BACKGROUND

In this section, we will lay out a conceptual framework for how international trade affects steady-state unemployment and economic diversification. First, we will explore why nations trade. Second, we will discuss the implications of specialization that arise from this trade. Third, we will consider the relationship between unemployment and economic diversity as it is commonly understood.

1. Why Nations Trade

This trade is typically described according to two prominent theories: Ricardian and Heckscher-Ohlin (H-O) comparative advantage. Trade "arises as a result of Ricardian comparative advantage based on relative technological differences and/or Heckscher-Ohlin comparative advantage based on international differences in relative factor endowments." (Dutt 2009) In other words, both Ricardian theory and H-O theory predict that economies will specialize in what they produce relatively best and, more dynamically, because such specialization creates increasing returns to production, agglomeration economies, and cumulative processes (Longhi 2005). However, the models differ in how they believe that happens: Ricardian theory holds that economies have different comparative advantages because of different levels of labor productivity (attributed to a range of technological capabilities). Contrarily, H-O theory assumes identical technology across economies, but assumes that comparative advantage is achieved due to different factor endowments of production.

Imagine a two-sector, single factor (labor), small-country economy under the Ricardian conception of comparative advantage. One sector produces a good that is highly demanded by foreign markets, and the other sector does not. Dutt and his colleagues explain that, in such circumstances, free trade results in an increase in the value of the marginal product of labor in the export sector because the price of the good is relatively higher – an increase attributed to foreign demand. By comparison, the non-exporting sector has a low marginal productivity of labor relative to the exporting sector (Eaton, et al. 2004).[1] Trade liberalization, then, makes the exporting sector more profitable – attracting labor and investment. The non-exporting sector is unable to keep pace and fails (Melitz 2003). If England and Portugal are trading partners and Portugal boasts a comparative advantage in the production of wine vs. linen, then the Ricardian model predicts that Portugal will specialize in wine and trade its surplus for linen. Meanwhile, England will specialize in linen production because they can trade their surplus for wine that costs less (and is probably much better) than wine they would otherwise produce themselves.

The Heckscher-Ohlin model is more flexible in this regard. Before the opening of trade, the relative price of a capital-intensive good is lower in a relatively capital-abundant country than in the rest of the world. Opening to trade will cause an increase in the relative price of the capital-intensive good in the country, similar to the increase of the marginal product of labor in the Ricardian model. However, because the H-O model considers the role of multiple factors of production, it predicts an increase in demand for capital relative to labor. Theoretically, this creates a Stolper-Samuelson effect (the main factor of production in the exporting good industry – capital – experiences an increase in return while the less-intensively used factor (labor) faces a decrease in return). This increase in productivity in the exporting sector promotes specialization,

[1] Eaton, Kortum, and Kramarz find evidence that exporting firms "tend to be more productive and larger" than non-exporting firms in their 2004 study of French industry.

as relatively high production costs keep companies out of industries at odds with their comparative advantage. (Schott 2008)

2. Implications of Specialization

These forces of specialization are so strong in the global economy that only the largest countries have the capacity to host significantly diversified economies due to a greater range of comparative advantage (due to larger national labor markets and more variety of resources). In other words, all but the very largest countries will fully specialize and will have a more volatile and, in the long run, higher unemployment rates. We assume that the larger an economy is, the more viable industries the economy can support.

These gains from specialization are well known. As Longhi summarizes, "Firms located in more specialized regions can gain from agglomeration effects, such as knowledge spillovers and labor pooling, and can, therefore, be generally more productive than similar firms located in less specialized regions" (Longhi 2005). However, such specialization has a stark downside. Highly specialized economies are highly sensitive to outside developments and are inherently less stable. Consider the city of Detroit, whose economy was heavily reliant on the auto industry. Certainly the major car manufacturers benefitted from the aforementioned "agglomeration effects," but when there was a sudden dip in the demand for automobiles, caused by an exogenous oil shock, the city suffered a deep contraction (Izraeli and Murphy 2001).

To the risk-averse policy maker, the answer is often to promote diversification within the economy. But will that always produce the desired effect?

3. Unemployment and Diversification

Most of the existing literature on the relationship of unemployment and economic diversification rests on one basic hypothesis: More industrially diverse areas should experience

less variable unemployment than highly specialized economies. (Izraeli and Murphy 2001). This can be attributed to unstable (cyclical) industries facing unstable economic forces, resulting in higher unemployment. In a specialized economy, all of your eggs are in one basket. If the demand for your export industry faces a sudden shock, there is no other industry to offset the ensuing pain. However, a diverse economy has many different industries which experience fluctuations of different severity and timing (Malizia and Ke 1993). Theoretically, an unaffected industry can pick up the slack of a temporarily suffering industry if they exist together in a diversified economy. Put another way, to the extent that labor and capital are somewhat mobile, the variance of unemployment and the average unemployment rate will be lower.

Yet, reality is not that simple. In order for this offset effect to work laborers must have interchangeable skills, so that workers in one sector must be able to find work in another sector. That will only happen if shocks affect one industry and not the other. That is, they are not systematically correlated. A national recession will generate unemployment across all sectors, unless one sector makes a good of highly inelastic demand (such as consumer staples) or makes an inferior good (such as hot dogs).

Additionally, areas with high skill-intensive occupational diversity should face unemployment similar to highly specialized areas (Izraeli and Murphy 2001). This is because a workforce with a highly heterogeneous/high skill set cannot easily absorb excess workers. If, for example, a shock to the price of steel reduced demand, steel mill workers would not be hired as doctors even if hospitals are looking to expand their staff. In this way, occupational diversity confounds economic diversity – it prevents unemployed laborers from being reabsorbed into the workforce, although jobs may be available in other sectors.

Previous studies indicate that diversification may induce a reduction in unemployment. Empirical data drawn mainly from the US economy suggests the existence of a positive correlation between sectoral specialization and labor market indicators such as wages and unemployment. (Longhi 2005). This is a trend confirmed by previous studies of American cities, (Simon 1988), (Diamond and Simon 1990), (Simon and Nardinelli 1992), states (Malizia and Ke 1993), (Izraeli and Murphy 2003), and US regions (Neumann and Topel 1991). Specifically, Malizia and Ke found that a "1% increase in industrial diversity leads to a 1.7% reduction in the unemployment rate and a 1.3% reduction in instability, while a 1% increase in occupational diversity results in a 1.3% increase in the unemployment rate" (Malizia and Ke 1993). At least at the city and state level, the effects of economic diversification on unemployment are clear.

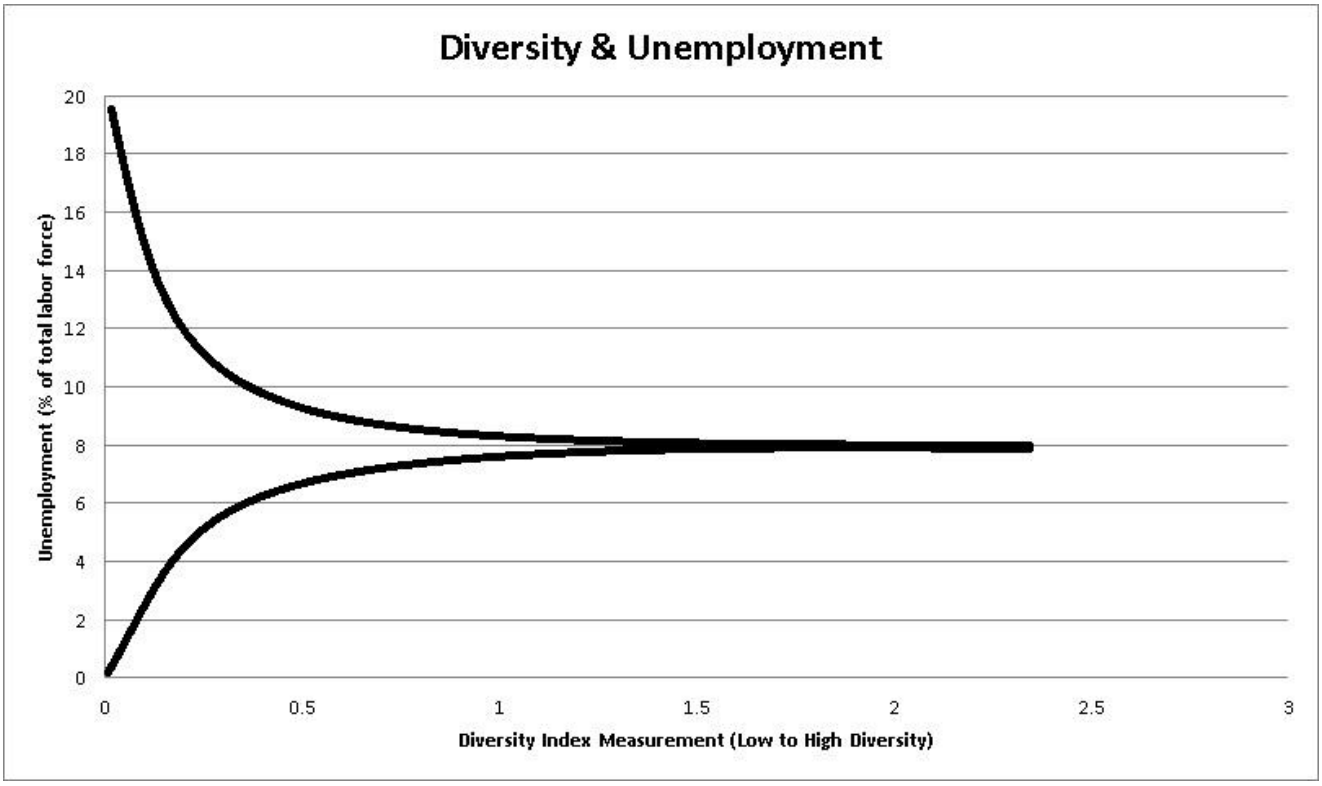
3.0 HYPOTHESIS

I make a few simplifying assumptions in my hypothesis. First, I assume all nations pursue GDP-maximizing goals, which implies that the citizens within each country are profit-maximizing. Second, I assume perfect openness to trade as we see in the Ricardian and H-O models. Third, I assume that trade dynamics and economic structure are the dominant determinants of long-run unemployment trends.

It is my hypothesis that we will not see a simple linear relationship between steady-state unemployment and economic diversity when we compare countries. Rather, I expect a particular pattern to emerge in a scatter plot between the two variables: I anticipate that the more diversified economies will have a common unemployment rate, while the less diversified economies will have employment rates that will either be lower or higher, depending on the nature of the industry that predominates.

I believe the data will reflect this because large, diversified economies will have an unemployment rate that reflects the conglomeration of many industries in one country: some industries will be labor-intensive, others will be capital-intensive, and the rest will be somewhere in the middle, resulting in an unemployment rate that is neither very low nor very high. Meanwhile, specialized economies (where only a small number of industries dominate) will have an unemployment rate that is either higher or lower. If the dominant industry is labor-intensive, then the demand for labor will be relatively high, resulting in a relatively low unemployment

rate. Conversely, if the dominant industry is capital-intensive, then the demand for labor will be relatively low, and I predict this will result in a comparatively high unemployment rate. Because this distinction is between two distinct groups (the diversified and the specialized), I expect to see a point at which the average unemployment rate ceases to be constant over time (for the large economies) and becomes increasingly variable (for the small economies). I anticipate the graph to look something like this:



It's important to emphasize how this conception differs from the Ricardian and H-O models. Both theories suggest that there will be full employment in the long run: Labor-intensive industries will thrive in populous countries (where labor is relatively cheaper) and capital-intensive will thrive in less populous countries (where capital is relatively cheaper). Yet, in the real world, we know that full employment rarely happens even in the steady-state. There are frictions, such as job searches, and new entrants.

We can point to two key mechanisms to understand why we would have my hypothesized image instead of the full-employment of the theoretical world. 1) As population inevitably increases, capital-intensive industries cannot absorb the rising labor force fast enough to keep pace. Capital accumulation and accommodation of the rising labor force takes an adjustment period. Imagine two countries, one with capital-intensive industry (Country A) and one with labor-intensive industry (Country B). If the population were to rise by the same amount in both countries, Country B will absorb the difference more easily while Country A cannot fully do so, creating unemployment. 2) Recessions notwithstanding, we anticipate that GDP rises over time. However, a similar rise in GDP creates different outcomes in our hypothetical countries. Let's say GDP rises by the same amount in Country A and Country B in a given year. The additional output is going to require more labor for Country B than it will for Country A, leading Country B to once again have the lower unemployment rate. Thus, we expect a divergence of steady-state unemployment rates for specialized economies, depending on which type of industry prevails.

As we move on to our own empirical study, we must keep a few critical questions in mind. Does the relationship between steady-state unemployment and diversity follow theoretical predictions? Does the connection between unemployment and economic diversity appear to be different at the international level compared to US cities and states? If so, how and why? Having examined the nature of international trade, the implications of specialization, and the theories of diversification's effect on unemployment, we are now ready to collect and analyze data from national economies.

4.0 RESEARCH METHODOLOGY

1. *Overview*

Our purpose is to examine the relationship between steady-state unemployment and economic diversity on a global scale. In order to do this, we must make inferences about the structure of each national economy so that we may graph these two variables together, along with controlling variables.

We will then evaluate the evidence presented by the resulting graph. Any correlation found between steady-state unemployment and economic diversity will be tested using the program STATA. This will give us a precise evaluation of the correlation's strength and relevance.

From this, we will learn how strongly economic diversity affects steady-state unemployment across nations.

2. *Sample*

Our sample will include the 193 Member or Observer states of the United Nations. I choose this particular list of recognized countries because I assume that UN member countries are the entities comprising what we refer to collectively as the global economy. Only a "real" country as recognized by the UN can be said to engage in international trade. In other words, we defer to the UN's designation of what is and what is not a country. The Holy See, however, is excluded from our study, despite having observer status at the UN, because the micro-state does not have an economy that functions in any way comparable to the rest of the

countries listed.[2] The Democratic People's Republic of Korea is also excluded due to a lack of reliable data. Occasionally, outliers will be removed from the range of graphs for clearer presentation.

3. *Dependent Variable*

Steady-state unemployment is our dependent variable. We assume that unemployment level is determined by the structure of the economy, rather than the opposite scenario. Steady-state unemployment for each of the countries under investigation is determined from data collected from the World Bank. Annual unemployment rates are taken from the years 1990 to 2005, and I then take the average of these rates over this period of time to determine the "steady-state" rate.

4. *Independent Variables*

As explained in the theoretical background, we hypothesize that the larger an economy is, the greater its capacity to sustain a diverse array of industries. As a first pass, then, we may reasonably use population size (as reported by the World Bank) as a proxy for economic diversification. A country with a larger population has a larger workforce, which can presumably staff a larger number of firms and, ultimately, a larger number of industries. This provides us with a convenient metric with which we can compare steady-steady state unemployment. We use population size as it was reported in 2005 to maintain continuity with the dependent variable.

Furthermore, we may also use GDP size as a proxy for economic diversification by applying similar logic. The assumption at work here is that the higher the amount of economic activity in an economy, the greater the variety is likely to be. I will correlate steady-state unemployment with population size and GDP in separate graphs, but I expect to obtain similar

[2] For a complete listing: http://www.un.org/News/Press/docs/2006/org1469.doc.htm

results. Our measurement is of real GDP as it stood in the year 2005, reported in USD at constant 2005 prices.

We find justification in utilizing these proxies for economic diversity from Yale economist Peter K. Schott, who points out that a key implication of Ricardian and H-O models is that "the number of horizontal varieties a country produces is predicted to be a function of the resources at its disposal – that is, the overall size of its economy or labor force." (Schott 2008). Empirically, Hummels and Klenow (2005) find a positive correlation between country size and the diversification of products countries export.

However, it ought to be possible to measure economic diversity directly. I consider economic diversity to depend on two factors: 1) the total number of different industries and 2) the evenness of distribution of GDP across the individual industries in the economy. For the purposes of our investigation, we will adopt and slightly alter the model of Henri Theil's entropy index (Theil 1972) as used to measure economic diversity by Malizia and Ke (Malizia and Ke 1993). That index increases as the economy becomes more diverse, either as a result of the presence of more industries or if GDP is more evenly distributed over those industries. The formula is as follows:

$$\mathrm{ENTR}i = \sum_{j=1}^{k} (Gij/Gi) \log (Gi/Gij)$$

where *i* stands for the *i*th country and *j* is the *j*th industry, k is the total number of industries in the *i*th country, G*ij* is the portion of GDP in the *j*th industry in country *i* and G*i* is total GDP in country *i*.

Unfortunately, the kind of per-sector output data for individual countries required to accurately differentiate between diversified and specialized economies is time consuming and

very expensive to obtain. I will address this in my conclusions. Here, however, I will present data taken from The United Nations (UN), The Global Trade Analysis Project (GTAP) and the Organization for Economic Co-operation and Development (OECD) to illustrate both the inadequacy of the easily available information and how the above entropy index could be applied to more sophisticated data. I will present more details on the subject when we examine my empirical results. Due to these difficulties, I will test my hypothesis using the proxies for economic diversification described above. All charts are from Excel, and statistical analysis will be performed using STATA.

5. *Controlled Factors*

As stated above, we choose to measure our steady-state unemployment rate as an average of rates taken from 1990-2005. I choose this time frame because it is recent enough that all the annual unemployment rates are still relevant to a given national economy (an unemployment rate taken from, say, 1890, is unlikely to be relevant because virtually every national economy is fundamentally different now than it was then). However, the timeframe is also broad enough to be representative of the structure of an economy because it includes multiple global recessions and recoveries. I end the data collection in 2005 to avoid distortions from the most recent financial crisis and global recession. For the independent variable, I use the GDP measurement from 2005 as it was a fairly typical year in global trade – safely before the most recent recession.

In our STATA regressions, we control for openness to trade. In our theoretical discussion, we assume perfect openness, which is clearly not the case in the global market place. According to our hypothesis, a country with significant impediments to trade may appear "artificially" diversified, as a higher cost of imports will sustain industries for which a given country may not have a high comparative advantage. Thus, a country that is relatively closed to trade will have a

different unemployment rate than our predictive models might otherwise suggest given its population and GDP size. Thus, to control for this, we introduce the CATO Institute's Trade Openness Index (1998) into our regressions. The higher a country's index value, the more open it is to trade.

6. *Confounding factors*

One metric I will not evaluate is occupational diversity, which is the presence of multiple occupations which have high entry barriers. In an economy with high occupational diversity, excess labor from one industry cannot move into another industry due to the high cost of entry into that labor market. For example, if a country has a labor force consisting entirely of doctors and lawyers, it can be said to have high occupational diversity due to the extreme costs of retraining lawyers as doctors and vice versa. I consider occupational diversity to be a confounding factor in our investigation. Although we know that the presence of occupational diversity has an effect on steady-state unemployment independent of economic diversity, the data required to effectively test for this effect is not available for individual countries. In my review of the literature, occupational diversity has only been successfully measured within US cities and states. I will address the implications of this "omitted variable" in my conclusions.

Rates of employment can be positively or negatively influenced by a broad number of factors such as warfare, discrimination, a generous social safety net, forced labor, and so on. Because of the obvious complexities that would arise from trying to control for all of these factors, we instead admit that they may influence our results in ways for which we have not taken account. However, we are looking at long term trends, and we assume that the structure of an economy and its openness to trade are the main long-run factors that impact unemployment.

Furthermore, due to the simple nature of the following regressions, we cannot discount the possibility that there is some other variable affecting the relationship between unemployment and diversity. Namely, it is possible that diversity affects some unknown factor X, which in turn affects unemployment. I believe this is improbable, as the theoretical relationship between the two factors is clear and intuitive. However, study with more sophisticated mathematical tools and more detailed data is required to discount this possibility with certitude.

5.0 EMPIRICAL RESULTS

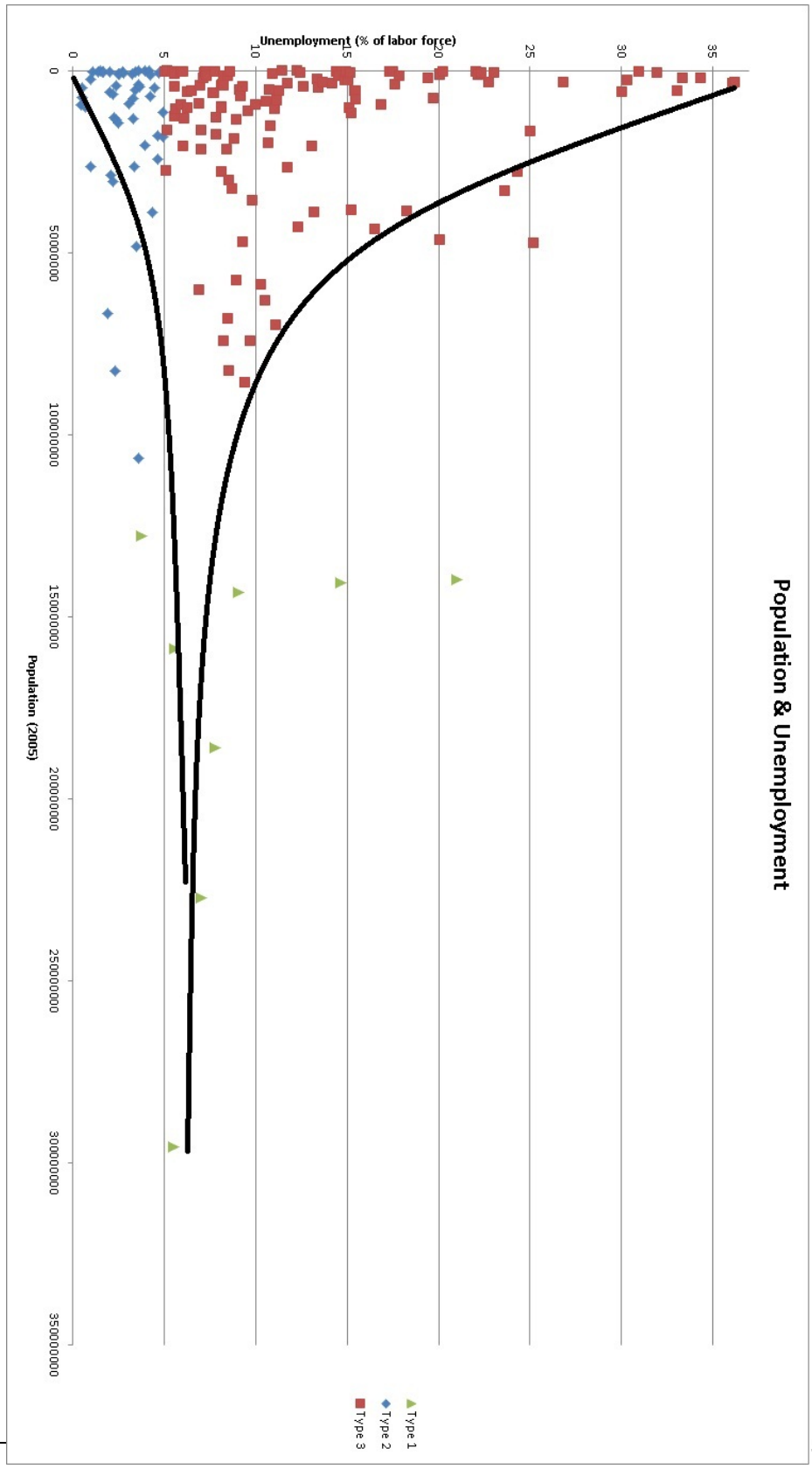
We begin the discussion of our empirical results with our graph comparing population (as a proxy for diversity) and the results of our "steady-state" unemployment calculations (Figure 1). Clearly, this graph displays the relationship between diversity and steady-state unemployment that theory predicts. We see that the more diversified (larger) economies tend to have an unemployment rate right around 5% to 7%, while the more specialized (smaller) economies tend to have either a higher or lower level. It seems that the more specialized economies begin to branch out significantly with populations greater or less than 120,000,000.

Overall, STATA analysis with our control variable Trade Openness Index (TOI) suggests a weakly negative correlation between population and unemployment, with a correlation coefficient of -1.01e-8 (for population) and an R^2 value of 0.0116.[3] However, it is clear from the graph that we could create separate regressions for the diversified (large) economies (referred to going forward as Type 1), the specialized economies with low unemployment (Type 2), and the specialized economies with high unemployment (Type 3) that would fit the data neatly. In order to fit with our hypothesized graph, the regression for Type 1

[3] The notation (-1.01e-8) should be read as (-1.01×10^{-8}). I will use this form of notation throughout the paper.

would have to be nearly flat, Type 2 would have to be steeply positive, and Type 3 would have to be steeply negative.[4]

[4] For the purposes of mathematically mapping the apparent pattern that emerges in the chart, we define the "types" as follows: We consider Type 1 to include countries with a population above 120 million. Type 2 includes all countries with unemployment below 5%. Type 3 includes all countries with an unemployment rate above 5%. Type 1 countries are included in either the Type 2 or Type 3 regressions, depending on their unemployment rates.


Population & Unemployment
Unemployment (% of labor force)
0
5
10
15
20
25
30
35
Population (2005)
0
50000000
100000000
150000000
200000000
250000000
300000000
350000000
Type 1
Type 2
Type 3

[5]

[5] Figure 1

Using STATA, we find this to be the case. The model for our regressions take the form of *Unemployment*(hat) = B_0 + B_1*Population* + B_2*PopulationSq* + B_3*TOI*. [6] Our results for the three "types" are as follows:

Type 1:

Name	Value	Standard Error
Constant	**6.377084****	**4.132833**
Population	**2.68e-09****	**1.86e-08**
Population^2	**-.1407769****	**.83677**
Trade Openness Index	**.099415****	**.1245817**

We see that the slope is mostly flat, while the constant is 6.377084, corresponding with a 6.4% unemployment rate which is right around the middle of our graph. This is roughly the result that we expected.

Type 2:

Name	Value	Standard Error
Constant	**2.679118****	**.8718116**
Population	**9.11e-10****	**8.97e-09**
Population^2	**6.83e-19****	**9.28e-17**
Trade Openness Index	**.099415****	**.1245817**

[6] "PopulationSq" is population squared, and "GDPSq" is GDP squared. "TOI" stands for Trade Openness Index.

So, from this model, we discover that a population rise from 10 million to 60 million is associated with an unemployment rate rise from 2.688% to 2.736%. This reflects the positive relationship we see in the graph.

Type 3:

Name	Value	Standard Error
Constant	**15.37126****	**2.821753**
Population	**–1.19e-08****	**3.19e-08**
Population^2	**–2.77e-17****	**1.32e-16**
Trade Openness Index	**–.6349063****	**.4062333**

Finally, for Type 3, we find a negative slope when we run a similar regression. Interpreting this regression, we find that a population rise from 10 million to 60 million is associated with an unemployment rate decline from 15.255% to 14.757%. Thus, our data analysis confirms the trend within each of our types matches that of our original theory.

For the sake of comparison, let's now consider our other diversity proxy: GDP size as compared to our steady-state unemployment values. Here, our chart (Figure 2) using empirical data matches our theoretical conception even more closely. At right around $3.5e11 total GDP, we again see the sorting of specialized (small) economies into high and low steady-state unemployment. With the important caveat that we take population and GDP to be stand-ins for economic diversity, I take the above charts as evidence supporting my hypothesis: the data is behaving very much like theory predicts.

Just like the previous graph, the linear regression line describes an extremely weak, negative correlation between the dependent and independent variables. For this data set, STATA

analysis finds a slope coefficient of -8.57e-13 (for GDP) and an R^2 value of 0.0075. This suggests that there may be more specialized economies with high unemployment than there are specialized economies with low unemployment.

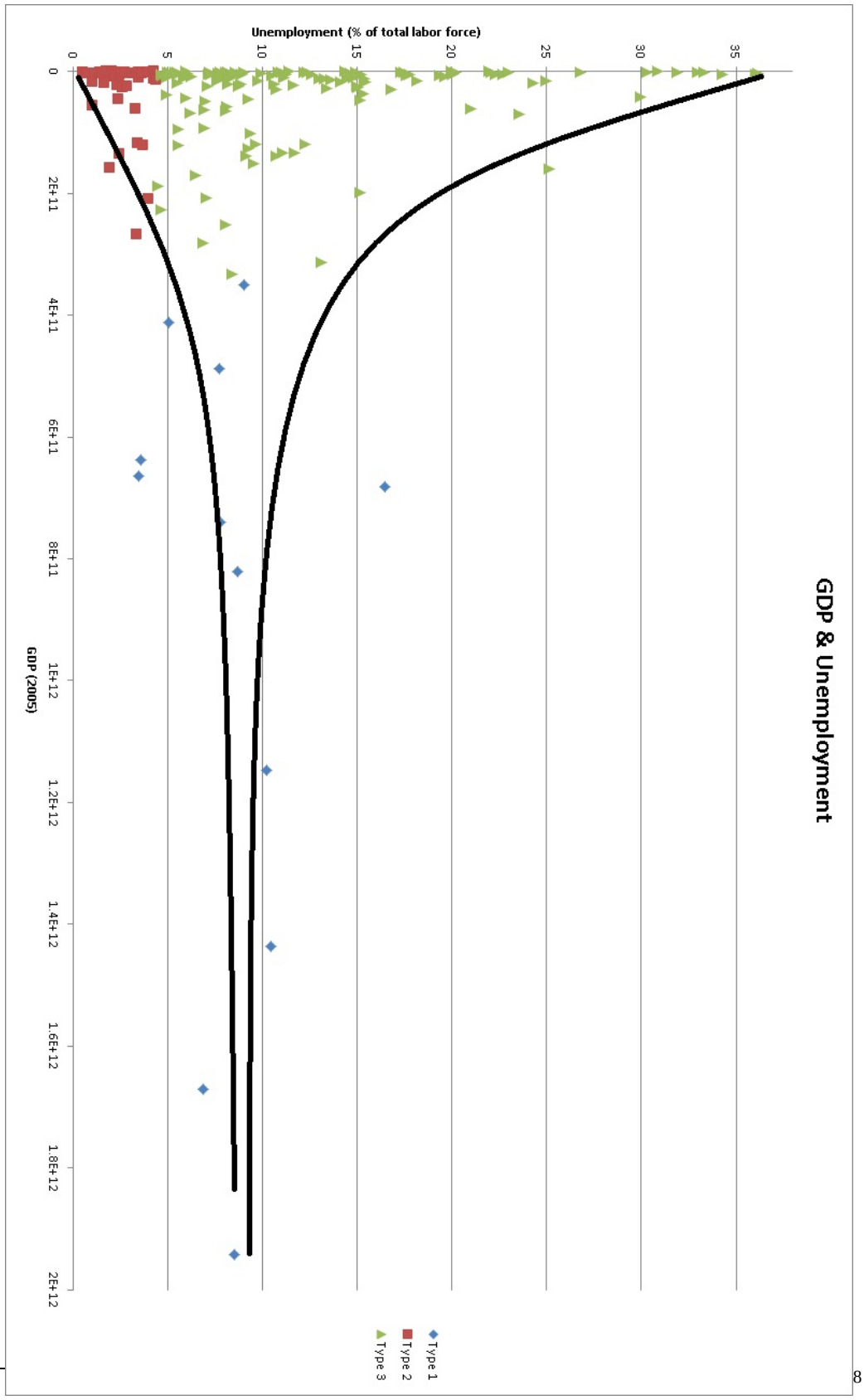
Using STATA, we can break down this graph into its elements just as we did with the comparison of population and unemployment.[7] Now, our model takes the form of $Unemployment(\text{hat}) = B_0 + B_1 GDP + B_2 GDPSq + B_3 TOI$. The results are as follows:

Type 1:

Name	Value	Standard Error
Constant	**7.857905****	**6.386125**
GDP	**-1.16e-12****	**1.47e-12**
GDP^2	**7.92e-26****	**1.29e-25**
Trade Openness Index	**.0847239****	**.8235047**

The regression of Type 1 countries produces a highly similar result to our first regression using the population data. We find nearly flat slope and a constant of approximately 7.7, which is again near the middle.

[7] This time, Type 1 refers to countries with a GDP over $3.5e11. Type 2 refers to all countries with an unemployment rate below 4.5%. Type 3 refers to all countries with an unemployment rate above 4.5%. Type 1 countries are included in either the Type 2 or Type 3 regressions, depending on their unemployment rates. We continue to control of trade openness using the Trade Openness Index. We use 2005 as a base year for USD.


GDP & Unemployment
Unemployment (% of total labor force)
0
5
10
15
20
25
30
35
GDP (2005)
0
2E+11
4E+11
6E+11
8E+11
1E+12
1.2E+12
1.4E+12
1.6E+12
1.8E+12
2E+12
Type 1
Type 2
Type 3

[8] Figure 2

Type 2:

Name	Value	Standard Error
Constant	**2.381549****	**.8205258**
GDP	**9.20e-14****	**5.32e-12**
GDP^2	**3.59e-25****	**7.76e-24**
Trade Openness Index	**.1191727****	**.1400077**

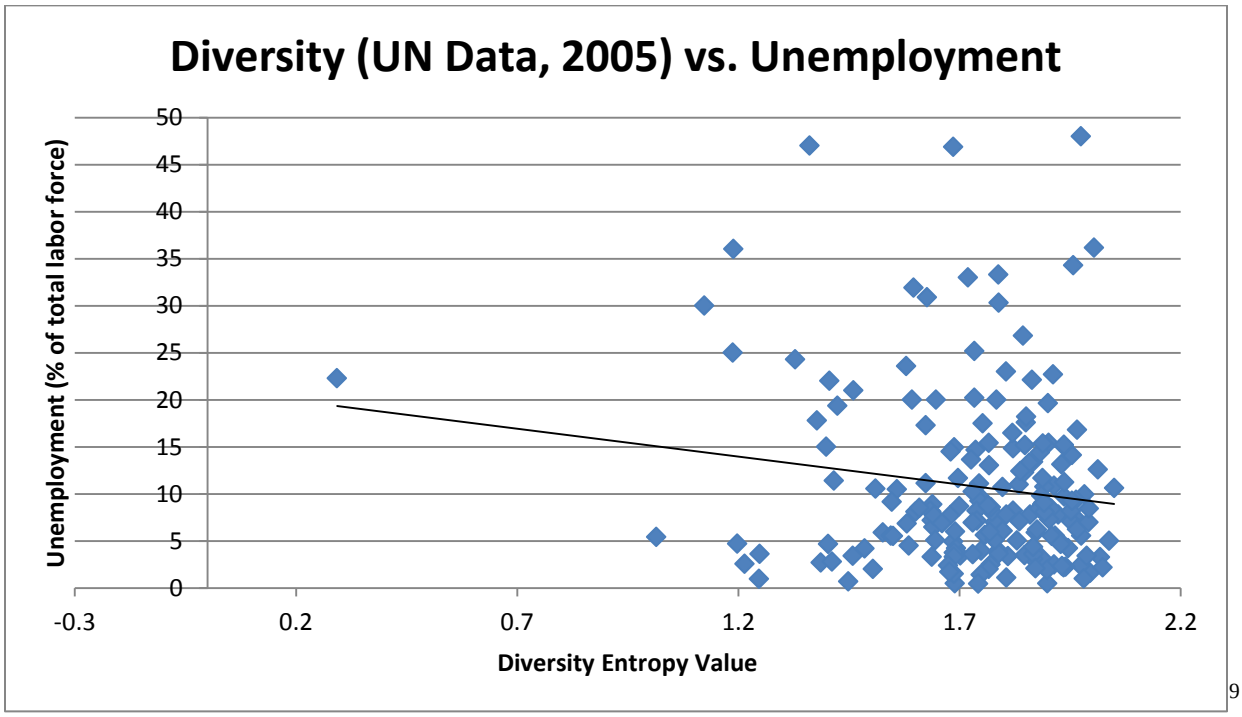
Within this type, an increase in GDP from $500 Billion to $1 Trillion to is associated with an increase in the unemployment rate from 2.52% to 2.833%. Thus, we have the positive relationship we expected to find, just like Type 2 in the population regression.

Type 3:

Name	Value	Standard Error
Constant	**13.84161****	**2.748001**
GDP	**–1.17e-12****	**2.29e-12**
GDP^2	**6.70e-26****	**2.09e-25**
Trade Openness Index	**–.4582089****	**.4253379**

Finally, Type 3 produces a negatively-sloping regression with equation. Interpreting this regression, we find that a GDP increase from $500 Billion to $1 Trillion is associated with a decrease in unemployment from 13.24% to 12.6%. This suggests a similar dynamic as the one seen in Type 3 in the population regression. When we use both population and GDP as a proxy for diversity, we get a result neatly in line with our original hypothesis.

This very clear pattern fades when we evaluate per-sector output with the adapted Theil entropy index described in the research methodology. First, I attempted to get a measurement of diversity using the UN's 6-sector output tables for all of the countries included in our study. This was the result (Figure 3):



[9]

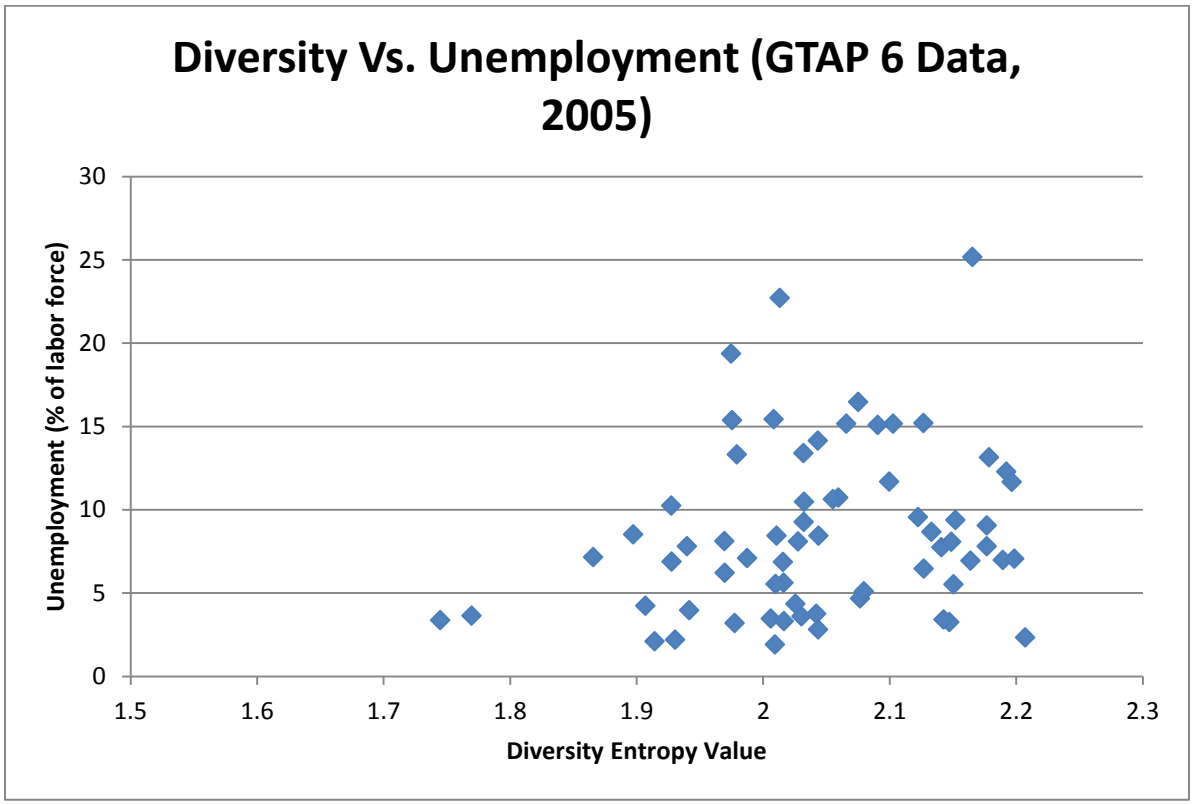
Like the other two charts, the trend line is negative-sloping, and variance seems to increase moving right to left. But the similarities end there. I believe that this chart is dissimilar from the others because it does not adequately represent differences in diversity. The six sector aggregation groups economic activity as agriculture, mining/utilities, manufacturing, construction, wholesale and retail trade, transportation/storage/communication, and "Other Activities."

This kind of differentiation means that larger economies with a sizeable and diverse service sector like the US will appear less diverse than they actually are. This occurs because the bulk of

[9] Figure 3

economic activity is simply lumped together under "Other Activities." To illustrate the problem with an example, our Theil index shows Zambia – with an entropy value of 1.9363 – to be more diverse than the US, measured as a measly 1.5446. It is inconceivable that the world's largest economy is also one of the world's least diverse economies. Clearly, a more comprehensive breakdown of economic activity by industry is necessary to obtain a more plausible result.

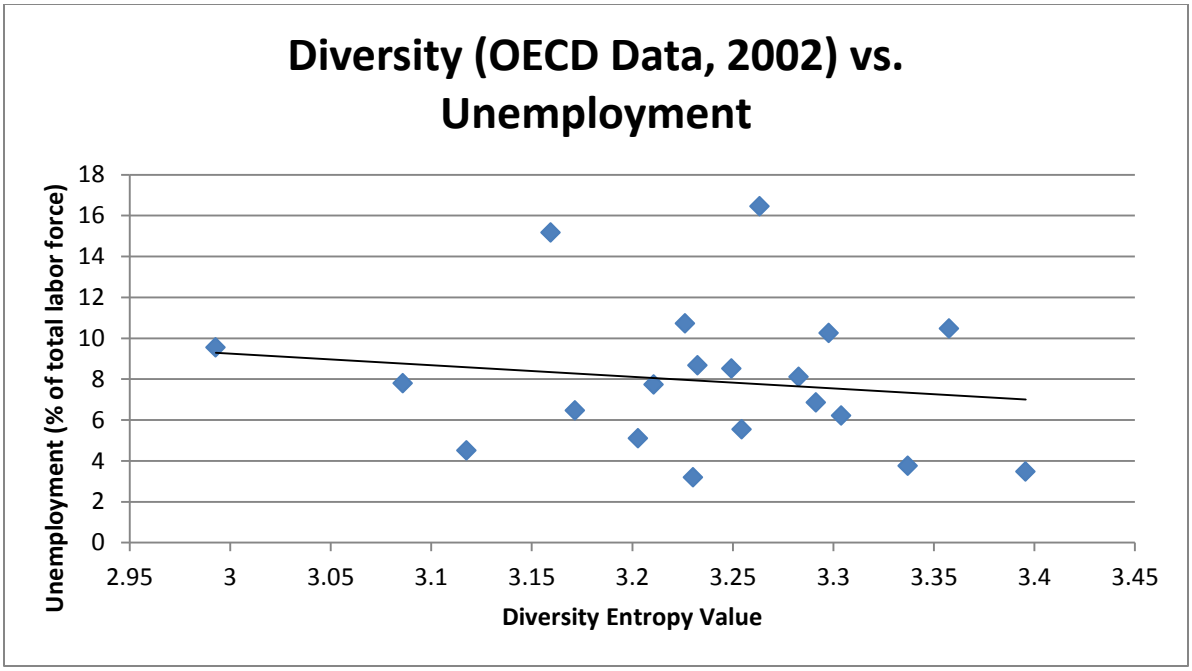
However, I encountered the same problem with every other source I found which records economic activity by sector for a large number of countries. The 10-sector aggregation of the GTAP 6 data also underreports the economic diversity of large economies (Figure 4):



[10]

The pattern is almost identical to the UN data. We fail to see the kind of differentiation present in the population and GDP comparisons. A review of the OECD data produces a similar result, even though the organization offers information on 41 sectors (Figure 5):

[10] Figure 4



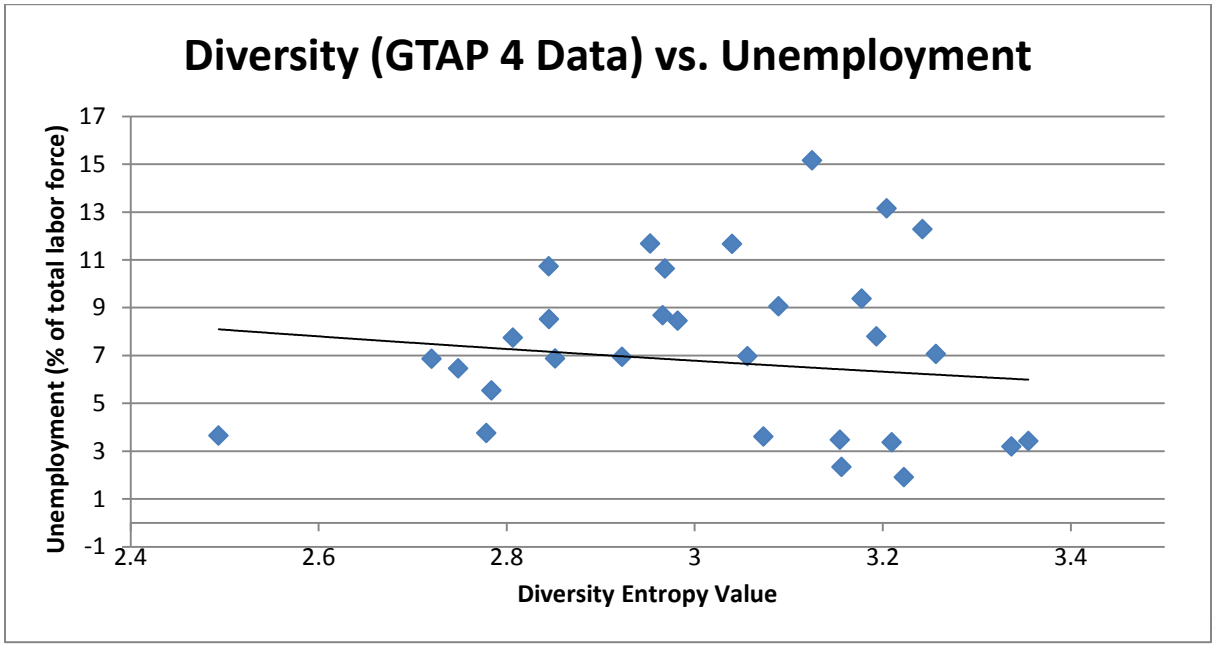
[11]

When we compare entropy values as we did with the UN data, we see a similar problem: the Czech Republic (3.3039) is somehow measured as more diverse than the US (3.2545).

Lastly, we turn to the GTAP 4 data. Taken in 1994, this data set boasts a 50 sector disaggregation. Yet, it too suffers from the same syndrome as the UN data (Figure 6). Much like the UN, OECD, and GTAP 6 data, the GTAP 4 data lumps too much economic activity into the same "sector". There is extensive differentiation between different kinds of agricultural and mineral products ("paddy rice" and "processed rice" each get their own sector), but any kind of economic activity that can be considered part of the "service industry" is limited to just three sectors out of the fifty: Trade/transport, Financial/business/recreational services, and public administration and defense/ education/health.[12] Little wonder that this lop-sided differentiation skews the results (Compare the US's 2.7838 to Uruguay's 3.0399). Neither the IMF nor the

[11] Figure 5
[12] For a complete listing, go to: https://www.gtap.agecon.purdue.edu/databases/v4/v4_sectors.asp

World Bank offer detailed per-sector output data, so it seems there is nowhere else to turn that offers publicly-available information.[13]



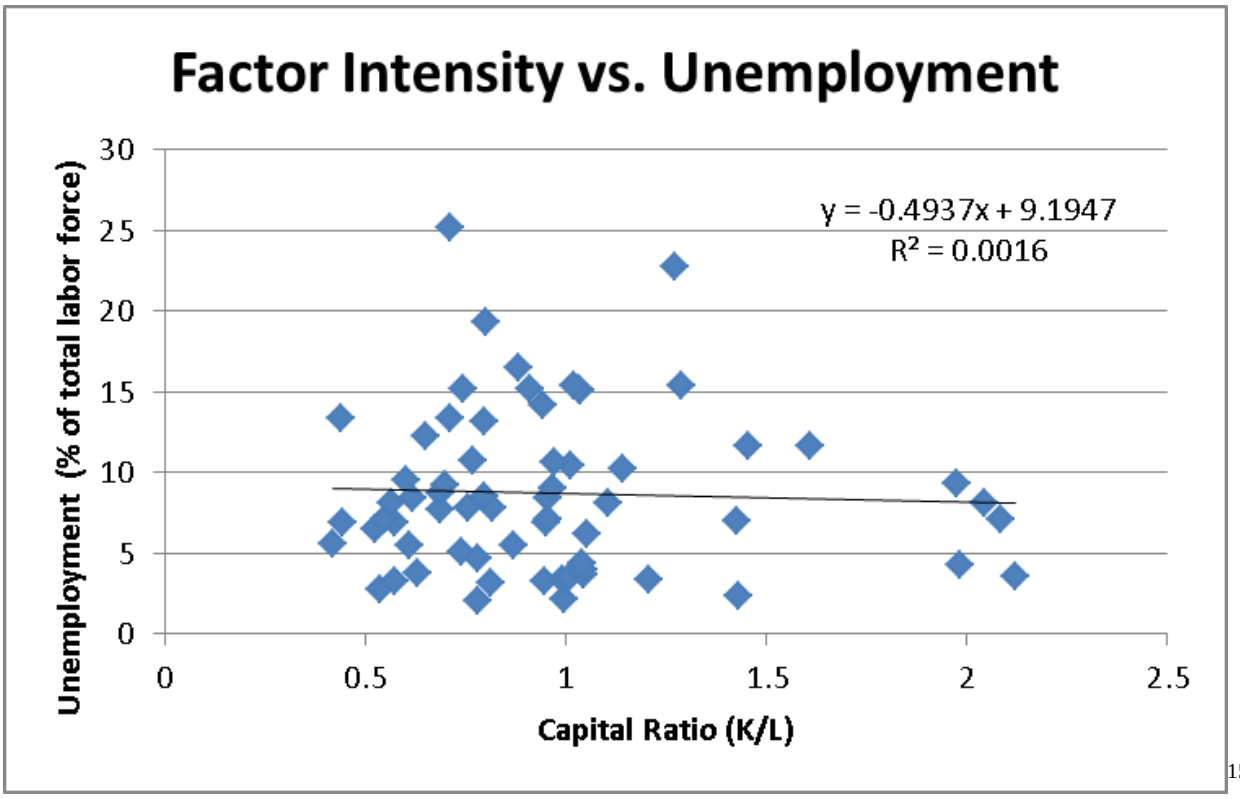
[14]

As mentioned above, it seems that our hypothesized pattern does indeed appear in our graphs when we use both country population and GDP as proxies for diversification. However, my original belief was that this differentiation could be attributed to capital intensity. I expected to find that predominantly labor-intensive economies would have low unemployment, and capital-intensive countries would have high unemployment. To test this supposition, I calculated capital intensity (K/L) for each country included in the GTAP 6 data and graphed the outcomes with our calculated steady-state unemployment values. I obtained this result (Figure 7).

Instead of finding a strongly positive correlation between the two variables, we find that there is virtually *no* relationship. This indicates that differences in capital intensity do *not*

[13] GTAP does collect much more detailed data that may prove useful for differentiating levels of diversification, but this information is prohibitively expensive for the purposes of this paper.
[14] Figure 6

account for the differentiation of steady-state employment rates among specialized economies. My original hypothesis is therefore false.

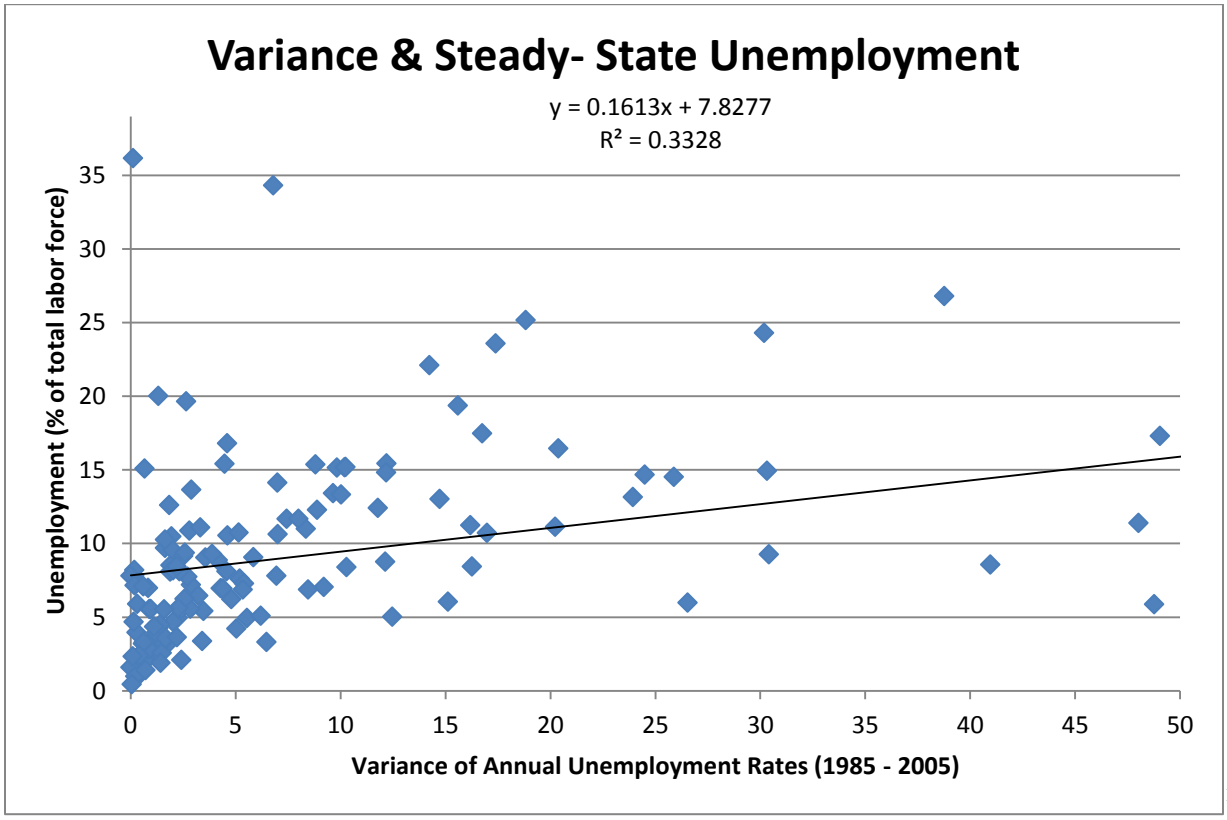


[15]

However, it is plausible that economic stability plays a role in determining the differentiation between specialized economies we have just seen in the population and GDP regressions on unemployment. In addition to the aforementioned link suggested in the literature, we find our own empirical support I collected the annual unemployment rates from the World Bank and measured their variance between 1985 and 2005, then measured the variance of the obtained rates. The assumption at work here is that unemployment variance reflects industrial instability because it expresses variations in the demand for labor. Intuitively, countries that specialize in an unstable industry will have high unemployment variance, and vice versa. When

[15] Figure 7

we run a regression of the variance of annual unemployment rates on our previously obtained steady-state unemployment rates, we find a clearly positive relationship (Figure 8):



[16]

On close examination, we see that – if we were to remove the outliers beyond a variance of 20 – the relationship would be *very* steeply positive.

Extrapolating from our graph, it seems likely that industrial instability has some influence on steady-state unemployment. This matters because it helps explain why large economies that have diversified away from unstable industries enjoy moderate unemployment rates. Perhaps highly-specialized countries either happen to specialize in unstable industries that beget high unemployment, or specialize in stable industries where the lack of disruptions keeps employment relatively low. Meanwhile, diversified economies have a combination of the two, resulting in an

[16] Figure 8

overall steady-state unemployment rate that is somewhere in the middle. While more research is necessary to definitively prove the existence of a link between industrial instability and unemployment in the context of international trade, such a link would help account for the specific pattern that we observed in the diversity and unemployment regressions.

6.0 POLICY RECOMMENDATIONS

As I noted in the introduction, a low and predictable unemployment rate is socially desirous. Democratic and despotic governments alike have an incentive to help their citizens attain the dignity and comfort a steady job provides (Barro 1994).[17] While it may be conventional wisdom to promote economic diversification at the national level for every economy, the results of our exploration suggest that the picture is a bit more complicated. Assuming a low unemployment rate is a universal goal, the priorities of a policy maker ought to depend heavily on what kind of country they represent.

The first lesson is to pursue economic diversification only if the country in question is relatively large. As we discussed in our theoretical background, the forces of international trade – whether by the Ricardian model or the H-O model – will eventually drive smaller countries to specialize. Thus, diversification efforts will either require prolonged, market-distorting government intervention or will inevitably fail.

There are some countries, like the oil-rich Nigeria, which may not have this problem. Taken from the UN's 2005 figure, Nigeria boasts a population of 139,823,340, yet suffers from a 21% unemployment rate. This is far above the average for countries that are also relatively large. Brazil, for example, has a slightly higher population but a much lower unemployment rate

[17] In Robert J. Barro's study of political freedom and economic success, he argues that all kinds of governments face similar pressure to achieve growth. He suggests a "nonlinear relationship in which democracy enhances growth at low levels of political freedom but depresses growth when a moderate level of freedom has already been attained."

(measured at 7.8%). It's entirely conceivable that Nigeria is large enough to sustain a truly diversified economy, and could achieve it by investing heavily in new, productive industries. Cape Verde, with its 472,883 citizens, almost certainly cannot bring its 23% steady-state unemployment rate down using the same strategies.

Small countries that have the misfortune of being on the high end of the unemployment spectrum are likely better off abandoning costly diversification schemes and instead should pursue an economic union with other countries in their region. By doing so, small/specialized countries can still reap the benefits of economic diversity. Such an economic bloc, with no trade barriers, free mobility of labor, and – possibly – a single currency, would enable the labor force in specialized economies to freely move to more prosperous industries hosted by their neighbors in the event of a negative shock. Capital and technical competence could move freely within the economic zone, creating positive agglomeration effects, among other structural improvements. For all intents and purposes, such economic unions would create one big, diversified economy.

This is in no way a panacea, of course. Such a strong union could create perverse incentives; rewarding the profligate at the expense of the penny-wise, as is the case with Greece and its Eurozone partners. However, strict rules and careful planning can minimize these dangers while bringing down unemployment and boosting growth. Since the introduction of the Euro in 1999, participating European nations have effectively acted as one large national market (although it takes years to bring about long-term structural change in national economies). Future researchers can determine if my intuition about the effect of regional economic conglomeration by finding evidence that Eurozone countries – when taken alone – are more specialized than their respective unemployment rates would suggest. This is not a new idea. Nobel-winning economist Paul Krugman predicted in 1991 that, eventually, the world economies would conglomerate until we

have three or four main economic blocs precisely due to the trade advantages to be had from such arrangements.

7.0 CONCLUDING REMARKS

In this paper I have advanced a theory describing how the effects of comparative advantage drive smaller countries to specialize, causing them to have either high or low steady-state unemployment rates depending on the nature of their dominant industry. Using total population and GDP as proxies for economic diversity, empirical data provided evidence supporting only part of my hypothesis. We see that the largest economies behave the way we would expect the most diversified economies to behave, with a steady-state unemployment rate somewhere the near the middle of the pack. Meanwhile, smaller countries must, by their nature, specialize in industries which afford them a comparative advantage. The result of this is an unemployment rate that is typically either above or below that of the large economies, creating a pattern that is distinctly different from the simple linear suggested by researchers like Malizia and Ke in their study of US metropolitan areas. While the differentiation of steady-state unemployment rates among specialized countries is not a function of capital intensity, it may be partially attributed to differences in industrial stability. The implication is that more diversification is not always desirable or, in the long run, possible. Instead, policy makers are better off tailoring economic strategy to the specific character of the country in question.

This leaves wide berth for continuing research. A study on the impact of occupational diversity on steady-state unemployment in the context of international trade would provide further insight. The hypothesis that diverse economies with high occupation diversity

have similar unemployment to specialized economies with low occupational diversity could be tested using many of the same methods outlined in this paper. Any confounding factor named in this study could likewise be the source of further exploration, as could the volatility of unemployment and GDP growth in specialized economies (as compared to diversified economies). This study does not consider underemployment along with unemployment, which is something future researchers may choose to consider.

Furthermore, elements of domestic economic structure (such as urbanization) may have an effect on a country's ability to capitalize on the benefits of economic diversity, and merit further study. As regional economic conglomerations continue to emerge and mature, future researchers can investigate the character of these organizations and determine to what extent the theoretical suppositions about them are borne out by the facts. We may yet find ways of avoiding much of the economic and societal pain that typically accompanies the inevitable dips in the business cycle.

Political scientists may gain insight from a comparative study of countries with specialized and diversified economies. It might be the case that diversified countries are more politically stable than their specialized counterparts, or that diversified economies are more capable of maintaining non-productive industries, such as a robust military. All of this would require extensive further study, and it is my belief that this paper lays the ground work for fruitful academic inquiry.

APPENDIX A

COUNTRY TABLES

Unemployment and Population:
Type 1: China, India, United States, Indonesia, Brazil, Pakistan, Russian Federation, Bangladesh, Nigeria, and Japan.
Type 2: Rwanda, Burundi, Eritrea, Chad, Kuwait, Uzbekistan, Benin, Maldives, Liechtenstein, Belarus, Vanuatu, Thailand, Lao People's Democratic Republic, Kiribati, Uganda, Mozambique, Tajikistan, Guatemala, Viet Nam, Cambodia, United Arab Emirates, Burkina Faso, Bhutan, Qatar, Andorra, Luxembourg, Guinea, China, Bangladesh, Niger, Switzerland, Malaysia, Sierra Leone, India, Iceland, Korea (Rep of), San Marino, Mexico, Monaco, Singapore, Japan, Mongolia, Austria, Palau, Honduras, Cyprus, Tanzania, Norway, Saudi Arabia, Madagascar, Brunei Darussalam, Cuba, and Côte d'Ivoire.
Type 3: Samoa, Nepal, Netherlands, St. Kitts and Nevis, Cayman Islands, Fiji, Zimbabwe, United States, Costa Rica, Pakistan, Portugal, Bolivia, Bahrain, Tonga, Myanmar, Mali, Czech Republic, Paraguay, Denmark, United Kingdom, Sweden, New Zealand, Chile, Romania, Indonesia, Slovenia, Malta, Antigua and Barbuda, Mauritius, El Salvador, Papua New Guinea, Australia, Cameroon, Malawi, Brazil, Peru, Belgium, Central African Republic, Hungary, Republic of Moldova, Lebanon, Gambia, Ethiopia, Ghana, Estonia, Turkey, Afghanistan, Germany, Seychelles, Canada, Syria, Ecuador, Congo, Dem. Rep., Kyrgyzstan, Russian Federation, Israel, Ireland, Ukraine, Philippines, Greece, Egypt, Kenya, Haiti, Italy, France, Bahamas, Sri Lanka, Finland, Kazakhstan, Guyana, Belize, Iran, Azerbaijan, Nicaragua, Tuvalu, Uruguay, Venezuela, St. Martin, Colombia, Suriname, Georgia, Yemen, Argentina, Latvia, Croatia, Panama, Lithuania, Sao Tome and Principe, Trinidad and Tobago, Barbados, Jamaica, Dominica, Oman, Tunisia, Morocco, Poland, Zambia, Slovakia, Jordan, Bulgaria, Spain, Dominican Republic, Grenada, St. Lucia, Bosnia and Herzegovina, Gabon, Sudan, Botswana, Serbia, Timor Leste, Comoros, Namibia, St. Vincent, Nigeria, Micronesia (Federated States of), Swaziland, Equatorial Guinea, Albania, Cape Verde, Algeria, Iraq, Angola, South Africa, Mauritania, Libya, Montenegro, Marshall Islands, Solomon Islands, Togo, Lesotho, Macedonia, Congo (Republic of the), Armenia, Guinea-Bissau, Somalia, Senegal, Djibouti, Turkmenistan, and Liberia.

Unemployment and GDP:

Type 1: Netherlands, Australia, Mexico, Korea (Rep of), Spain, Brazil, Canada, Italy, France, United Kingdom, Germany, Japan, India, China, and the United States.

Type 2: Rwanda, Burundi, Eritrea, Chad, Kuwait, Uzbekistan, Benin, Maldives, Liechtenstein, Belarus, Vanuatu, Thailand, Lao People's Democratic Republic, Kiribati, Uganda, Mozambique, Tajikistan, Guatemala, Viet Nam, Cambodia, United Arab Emirates, Burkina Faso, Bhutan, Qatar, Andorra, Luxembourg, Guinea, China, Bangladesh, Niger, Switzerland, Malaysia, Sierra Leone, India, Iceland, Korea (Rep of), San Marino, Mexico, Monaco, Singapore, Japan, Mongolia, Austria, Palau, Honduras, Cyprus, Tanzania, and Norway.

Type 3: Saudi Arabia, Madagascar, Brunei Darussalam, Cuba, Côte d'Ivoire, Samoa, Nepal, Netherlands, St. Kitts and Nevis, Cayman Islands, Fiji, Zimbabwe, United States, Costa Rica, Pakistan, Portugal, Bolivia, Bahrain, Tonga, Myanmar, Mali, Czech Republic, Paraguay, Denmark, United Kingdom, Sweden, New Zealand, Chile, Romania, Indonesia, Slovenia, Malta, Antigua and Barbuda, Mauritius, El Salvador, Papua New Guinea, Australia, Cameroon, Malawi, Brazil, Peru, Belgium, Central African Republic, Hungary, Republic of Moldova, Lebanon, Gambia, Ethiopia, Ghana, Estonia, Turkey, Afghanistan, Germany, Seychelles, Canada, Syria, Ecuador, Congo, Dem. Rep., Kyrgyzstan, Russian Federation, Israel, Ireland, Ukraine, Philippines, Greece, Egypt, Kenya, Haiti, Italy, France, Bahamas, Sri Lanka, Finland, Kazakhstan, Guyana, Belize, Iran, Azerbaijan, Nicaragua, Tuvalu, Uruguay, Venezuela, St. Martin, Colombia, Suriname, Georgia, Yemen, Argentina, Latvia, Croatia, Panama, Lithuania, Sao Tome and Principe, Trinidad and Tobago, Barbados, Jamaica, Dominica, Oman, Tunisia, Morocco, Poland, Zambia, Slovakia, Jordan, Bulgaria, Spain, Dominican Republic, Grenada, St. Lucia, Bosnia and Herzegovina, Gabon, Sudan, Botswana, Serbia, Timor Leste, Comoros, Namibia, St. Vincent, Nigeria, Micronesia (Federated States of), Swaziland, Equatorial Guinea, Albania, Cape Verde, Algeria, Iraq, Angola, South Africa, Mauritania, Libya, Montenegro, Marshall Islands, Solomon Islands, Togo, Lesotho, Macedonia, Congo (Republic of the), Armenia, Guinea-Bissau, Somalia, Senegal, Djibouti, Turkmenistan, and Liberia.

APPENDIX B

DATA TABLES

B.1 POPULATION

Country	Population (UN 2005)	Steady-state Unemp (AVG 1990-2005)	Source (if not the World Bank)
Afghanistan	29904962	8.5	
Albania	3141800	22.7	
Algeria	32888449	23.56923077	
Andorra	77,888	2.7	CIA
Angola	16489021	25	CIA
Antigua and Barbuda	83916	7.2	
Argentina	38681174	13.14375	
Armenia	3065954	36.15	
Australia	100996	7.7375	
Austria	20394800	3.95625	
Azerbaijan	8233300	11.13333333	
Bahamas	8391850	10.54285714	
Bahrain	319358	5.9	
Bangladesh	140587922	3.26	
Barbados	724807	14.6625	
Belarus	270503	1.6	
Belgium	9775591.494	8.1	
Belize	10478617	11	
Benin	291800	1.1	
Bhutan	659293	2.5	
Bolivia	9146655	5.878571429	

Bosnia and Herzegovina	3781001	17.6	
Botswana	1875673	19.35714286	
Brazil	185986964	7.8	
Brunei Darussalam	363123	4.7	
Bulgaria	7739900	15.43076923	
Burkina Faso	14198463	2.5	
Burundi	7251424	0.5	
Cambodia	13357574	2.4	
Cameroon	17553589	7.8	
Canada	32312000	8.675	
Cape Verde	472883	23	
Cayman Islands	52268	5.416666667	
Central African Republic	4017880	8.1	
Chad	9785902	0.7	
Chile	16301726	6.96875	
Colombia	43040558	12.28125	
Comoros	642974	20	
Congo, Dem. Rep	57420522	8.9	World Economic Outlook
Congo (Republic of the)	3533177	36.04	World Economic Outlook
Costa Rica	4309413	5.55	
Côte d'Ivoire	18020946	4.966666667	
Croatia	4442000	13.4	
Cuba	11254242	4.945454545	
Cyprus	1032562	4.2375	
Czech Republic	10235828	6.214285714	
Denmark	5415978	6.4625	
Dominica	68925	14.925	
Dominican Republic	9264267	16.80666667	
Ecuador	13426402	8.88	
Egypt[6]	74203215	9.6875	
El Salvador	6050513	7.60625	
Equatorial Guinea	607739	22.3	CIA
Eritrea	4486155	0.5	CIA
Estonia	1346097	8.43125	
Ethiopia	74263861	8.22	
Fiji	822553	5.522222222	
Finland	5246096	10.725	
France	63001253	10.475	
Gabon	1370729	17.8	
Gambia	1503678	8.2	allAfrica.com

Georgia	4361200	12.6	
Germany	82469400	8.513333333	
Ghana	21639806	8.4	
Greece	11103965	9.55625	
Grenada	102734	17.3	
Guatemala	12717154	2.266666667	
Guinea	9041448	3.1	
Guinea-Bissau	1367695	46.87	African Economic Outlook
Guyana	746235	10.86666667	
Haiti	9347262	9.95	
Honduras	6879243	4.223076923	
Hungary	10087065	8.107142857	
Iceland	296734	3.44	
Indonesia	227303175	7.054545455	
Iran	69732007	11.08	
Iraq	27598437.43	24.3	
Ireland	4159914	9.25625	
Israel	6930100	9.15625	
Italy	58607050	10.25	
Jamaica	2650400	14.825	
Japan	127773000	3.75625	
Jordan	5411500	15.4	
Kazakhstan	15147029	10.74166667	
Kenya	35614576	9.8	
Kiribati	91988	2	CIA
Korea (Rep of)	48138000	3.46875	
Kuwait	2264014	0.976923077	
Kyrgyzstan	5143500	9.05	
Lao People’s Democratic Republic	5753341	2	
Latvia	2300512	13.32	
Lebanon	4052420	8.2	
Lesotho	2065752	33.3	
Libya	5769709	30	CIA
Liechtenstein	34696	1.5	CIA
Lithuania	3414304	14.13333333	CIA
Luxembourg	465158	2.8	
Macedonia, FYR	2038109	34.3	
Madagascar	17885967	4.675	
Malawi	12822587	7.8	
Malaysia	26100241	3.364285714	
Maldives	295240	1.4	

Mali	13176642	6.05	
Malta	403837	7.15	
Marshall Islands	52037	30.9	
Mauritania	3047249	26.8	
Mauritius	1243253	7.276923077	
Mexico	106483757	3.6	
Micronesia (Federated States of)	109419	22	
Monaco	3595182	3.6	CIA
Mongolia	35260	3.94	
Montenegro	2547339	30.3	
Morocco	626739	15.15333333	
Mozambique	30392473	2.2	
Myanmar	20770013	6	
Namibia	46321162	20.02	
Nepal	27281945	5.033333333	
Netherlands	16319868	5.09375	
New Zealand	4133900	6.9375	
Nicaragua	5424336	11.22857143	
Niger	12993884	3.3	
Nigeria	139823340	21	
Norway	4623291	4.5	CIA
Oman	2429510	15	
Pakistan	158645463	5.563636364	CIA
Palau	19906	4.2	
Panama	3238321	13.64666667	CIA
Papua New Guinea	6095437	7.7	
Paraguay	5897816	6.24	
Peru	27558769	8.08125	
Philippines	85546427	9.375	
Poland	38165445	15.16428571	
Portugal	10549424	5.60625	
Qatar	820986	2.566666667	
Republic of Moldova	3595182	8.171428571	
Romania	21634371	6.983333333	
Russian Federation	143150000	9.057142857	
Rwanda	9201727	0.45	
Samoa	180237	5	
San Marino	30301	3.575	
Sao Tome and Principe	152622	14.4	
Saudi Arabia	24041116	4.675	

Senegal	10871908	48	
Serbia	7440769	19.65	CIA
Seychelles	82900	8.566666667	
Sierra Leone	5153435	3.4	
Singapore	4265800	3.64	
Slovakia	5387001	15.36153846	
Slovenia	2000474	7.092857143	
Solomon Islands	469805	31.9	
Somalia	8359859	47	
South Africa	47198469	25.16666667	
Spain	43398150	16.45625	
Sri Lanka	19842536	10.63125	
St. Kitts and Nevis	49173	5.1	
St. Lucia	164791	17.475	
St. Martin	27906	12.2	St. Maarten Labour Affiars Agency
St. Vincent	108755	20.2	
Sudan	38410320	18.2	
Suriname	499294	12.41	CIA
Swaziland	1104909	22.1	
Sweden	9024040	6.875	
Switzerland	7437115	3.3	
Syria[15]	18484122	8.76	
Tajikistan	6453240	2.2	
Tanzania	38831024	4.35	CIA
Thailand	66698483	1.906666667	
Timor Leste	1010367	20	
Togo	5408044	33	CIA
Tonga	100926	5.975	
Trinidad and Tobago	1315386	14.5125	
Tunisia	10029000	15.075	
Turkey	68143186	8.44375	
Tuvalu	9694	11.4	CIA
Uganda	28431204	2.1	
Ukraine	47105150	9.272727273	
United Arab Emirates	4069349	2.4	
United Kingdom	60224307	6.8625	
United States	295753000	5.5375	
Uruguay	3305723	11.66875	
Uzbekistan	26167369	1	
Vanuatu	211170	1.7	CIA
Venezuela	26577000	11.68125	CIA
Viet Nam	82393500	2.333333333	

Yemen	20648643	13.025
Zambia	11462365	15.2
Zimbabwe	12570686	5.525
OUTLIERS REMOVED FROM CHART		
Liberia	3182539	85
Turkmenistan	4747839	60
Djibouti	808367	51.5
India	1094583000	3.412958427
China	1303720000	3.19375

B.2 GDP

Country	GDP 2005 (USD in 2005 prices)	Steady-state Unemp (AVG 1990-2005)
Afghanistan	6814800000	8.5
Albania	4793518372	22.7
Algeria	69565187811	23.56923077
Andorra	1615237069	2.7
Angola	14934977575	25
Antigua and Barbuda	985378773.4	7.2
Argentina	3.13626E+11	13.14375
Armenia	3400246575	36.15
Australia	4.87736E+11	7.7375
Austria	2.08744E+11	3.95625
Azerbaijan	9926874167	11.13333333
Bahamas	5998331279	10.54285714
Bahrain	10709482414	5.9
Bangladesh	61393084272	3.26
Barbados	2557427999	14.6625
Belarus	18293979126	1.6
Belgium	2.5178E+11	8.1
Belize	1081553523	11
Benin	2727160225	1.1
Bhutan	635666173.1	2.5
Bolivia	9777941879	5.878571429
Bosnia and Herzegovina	7012968257	17.6
Botswana	7277848792	19.35714286

Brazil	7.39613E+11	7.8
Brunei Darussalam	6649465293	4.7
Bulgaria	16846951092	15.43076923
Burkina Faso	3505297330	2.5
Burundi	789697361.2	0.5
Cambodia	5710753630	2.4
Cameroon	12086601214	7.8
Canada	8.21941E+11	8.675
Cape Verde	680688571.1	23
Cayman Islands	1012400000	5.416666667
Central African Republic	913888742.9	8.1
Chad	3017980987	0.7
Chile	92415227477	6.96875
Colombia	1.19887E+11	12.28125
Comoros	231517228.6	20
Congo, Dem. Rep	5238595323	8.9
Congo (Republic of the)	3931789250	36.04
Costa Rica	19482907711	5.55
Côte d'Ivoire	10416603855	4.966666667
Croatia	26765073226	13.4
Cuba	39051403155	4.945454545
Cyprus	10920829406	4.2375
Czech Republic	68149732482	6.214285714
Denmark	1.70384E+11	6.4625
Dominica	356587477.3	14.925
Dominican Republic	28536865195	16.80666667
Ecuador	20976428515	8.88
Egypt[6]	1.18749E+11	9.6875
El Salvador	14752019854	7.60625
Equatorial Guinea	4186550477	22.3
Eritrea	719793566.5	0.5
Estonia	8390845144	8.43125
Ethiopia	11173546750	8.22
Fiji	1898582498	5.522222222
Finland	1.38681E+11	10.725
France	1.43626E+12	10.475
Gabon	5523001848	17.8
Gambia	488553988.1	8.2
Georgia	4354805817	12.6
Germany	1.94334E+12	8.513333333
Ghana	6364078886	8.4
Greece	1.51655E+11	9.55625
Grenada	579680174.8	17.3

Guatemala	22392362924	2.266666667
Guinea	3692243887	3.1
Guinea-Bissau	210770185.2	46.87
Guyana	738235712.2	10.86666667
Haiti	3565485817	9.95
Honduras	8919792791	4.223076923
Hungary	56884939841	8.107142857
Iceland	10720581749	3.44
Indonesia	2.07891E+11	7.054545455
Iran	1.3295E+11	11.08
Iraq	19014403325	24.3
Ireland	1.26164E+11	9.25625
Israel	1.38756E+11	9.15625
Italy	1.14684E+12	10.25
Jamaica	9918240838	14.825
Jordan	11525306728	15.4
Kazakhstan	29956875555	10.74166667
Kenya	15173416248	9.8
Kiribati	74288814.53	2
Korea (Rep of)	6.64392E+11	3.46875
Kuwait	55956356099	0.976923077
Kyrgyzstan	1649306468	9.05
Lao People’s Democratic Republic	2350428007	2
Latvia	11610367683	13.32
Lebanon	20786490334	8.2
Lesotho	858287180.8	33.3
Libya	41510873733	30
Liechtenstein	2585719909	1.5
Lithuania	16639625000	14.13333333
Luxembourg	24179117583	2.8
Macedonia, FYR	3877087656	34.3
Madagascar	4339312825	4.675
Malawi	1924131956	7.8
Malaysia	1.18224E+11	3.364285714
Maldives	814699389.6	1.4
Mali	3294054175	6.05
Malta	4112520653	7.15
Marshall Islands	123231360.8	30.9
Mauritania	1317067610	26.8
Mauritius	5326541854	7.276923077
Mexico	6.37055E+11	3.6
Micronesia (Federated States of)	239902743	22
Monaco	2885253733	3.6

Mongolia	1556365693	3.94
Montenegro	1130670093	30.3
Morocco	47200631556	15.15333333
Mozambique	6413908142	2.2
Myanmar	42953000000	6
Namibia	4972328354	20.02
Nepal	6491157510	5.033333333
Netherlands	4.11168E+11	5.09375
New Zealand	62717853637	6.9375
Nicaragua	4597552925	11.22857143
Niger	2185230256	3.3
Nigeria	61902502732	21
Norway	1.87788E+11	4.5
Oman	23622652660	15
Pakistan	94357063094	5.563636364
Palau	127987336.9	4.2
Panama	14349415139	13.64666667
Papua New Guinea	3817622470	7.7
Paraguay	8024827475	6.24
Peru	65432704696	8.08125
Philippines	1.01405E+11	9.375
Poland	1.99364E+11	15.16428571
Portugal	1.21814E+11	5.60625
Qatar	26455458550	2.566666667
Republic of Moldova	1813877409	8.171428571
Romania	48898332853	6.983333333
Russian Federation	3.4971E+11	9.057142857
Rwanda	2506731585	0.45
Samoa	314000699	5
San Marino	911330494.8	3.575
Sao Tome and Principe	196806600	14.4
Saudi Arabia	2.26945E+11	4.675
Senegal	5892630725	48
Serbia	7888605693	19.65
Seychelles	597623469.4	8.566666667
Sierra Leone	1206157644	3.4
Singapore	1.21185E+11	3.64
Slovakia	36495488121	15.36153846
Slovenia	23866572258	7.092857143
Solomon Islands	458344309.2	31.9
Somalia	2316000000	47
South Africa	1.60367E+11	25.16666667
Spain	6.81876E+11	16.45625

Sri Lanka	19838649830	10.63125
St. Kitts and Nevis	448388479.4	5.1
St. Lucia	793196038.3	17.475
St. Martin	599000000	12.2
St. Vincent	473319264.7	20.2
Sudan	16042683061	18.2
Suriname	1178026322	12.41
Swaziland	1667600985	22.1
Sweden	2.82365E+11	6.875
Switzerland	2.66696E+11	3.3
Syria	24589823328	8.76
Tajikistan	1393235591	2.2
Tanzania	14317750541	4.35
Thailand	1.57385E+11	1.906666667
Timor Leste	314100000	20
Togo	1478708606	33
Tonga	208129393.6	5.975
Trinidad and Tobago	11977188024	14.5125
Tunisia	26612888891	15.075
Turkey	3.33041E+11	8.44375
Tuvalu	15253858.24	11.4
Uganda	8565136257	2.1
Ukraine	45231599857	9.272727273
United Arab Emirates	1.35461E+11	2.4
United Kingdom	1.67155E+12	6.8625
Uruguay	23032530046	11.66875
Uzbekistan	17905997172	1
Vanuatu	286308873.2	1.7
Venezuela	1.32887E+11	11.68125
Viet Nam	44769045610	2.333333333
Yemen	11614291703	13.025
Zambia	4093330085	15.2
Zimbabwe	4431487581	5.525
OUTLIERS REMOVED FROM CHART		
Liberia		85
Turkmenistan		60
Djibouti		51.5
India		3.412958427
China		3.19375
DPRK had to be omitted due to a total lack of credible unemployment estimates.		
United States	1.11504E+13	5.5375
Japan	4.97955E+12	3.75625

B.3 DIVERSITY: UN DATA

Country	Diversity (UN Entropy Value - 2005)	Steady-state Unemp (AVG 1990-2005)
Afghanistan	1.904585	8.5
Albania	1.911259855	22.7
Algeria	1.579291478	23.56923077
Andorra	1.386275873	2.7
Angola	1.18757659	25
Antigua and Barbuda	1.637503604	7.2
Argentina	1.930336163	13.14375
Armenia	2.003961733	36.15
Australia	1.679509115	7.7375
Austria	1.748743973	3.95625
Azerbaijan	1.623794935	11.13333333
Bahamas	1.510225461	10.54285714
Bahrain	1.526308485	5.9
Bangladesh	2.017600348	3.26
Barbados	1.736243816	14.6625
Belarus	1.995303927	1.6
Belgium	1.636740448	8.1
Belize	1.833752273	11
Benin	1.806119741	1.1
Bhutan	1.913670299	2.5
Bolivia	1.872616887	5.878571429
Bosnia and Herzegovina	1.850053259	17.6
Botswana	1.423618849	19.35714286
Brazil	1.859481952	7.8
Brunei Darussalam	1.197638923	4.7
Bulgaria	1.901452883	15.43076923
Burkina Faso	1.770223198	2.5
Burundi	1.689162764	0.5
Cambodia	1.973366486	2.4
Cameroon	1.922829718	7.8
Canada	1.699776912	8.675
Cape Verde	1.8053629	23
Cayman Islands	1.01433194	5.416666667
Central African Republic	1.600289959	8.1
Chad	1.448304844	0.7
China	1.885366361	3.19375
Chile	1.779733551	6.96875
Colombia	1.846313706	12.28125

Comoros	1.592686298	20
Congo, Dem. Rep	1.638917857	8.9
Congo (Republic of the)	1.188862874	36.04
Costa Rica	1.916082605	5.55
Côte d'Ivoire	1.926580936	4.966666667
Croatia	1.86672488	13.4
Cuba	1.685757283	4.945454545
Cyprus	1.691986811	4.2375
Czech Republic	1.875188359	6.214285714
Denmark	1.641012928	6.4625
Dominica	1.687774412	14.925
Dominican Republic	1.965995469	16.80666667
Ecuador	1.887029712	8.88
Egypt	1.936481532	9.6875
El Salvador	1.958989797	7.60625
Equatorial Guinea	0.292554051	22.3
Eritrea	1.898781988	0.5
Estonia	1.880491434	8.43125
Ethiopia	1.633647939	8.22
Fiji	1.908331174	5.522222222
Finland	1.797429997	10.725
France	1.558288599	10.475
Gabon	1.377560872	17.8
Gambia	1.820996434	8.2
Georgia	2.012908821	12.6
Germany	1.609176941	8.513333333
Ghana	1.907957823	8.4
Greece	1.748956133	9.55625
Grenada	1.623512057	17.3
Guatemala	1.939676232	2.266666667
Guinea	1.866716193	3.1
Guinea-Bissau	1.685547074	46.87
Guyana	1.913456787	10.86666667
Haiti	1.982413297	9.95
Honduras	1.945425708	4.223076923
Hungary	1.773357809	8.107142857
Iceland	1.701746289	3.44
India	1.987506643	3.412958427
Indonesia	1.952719161	7.054545455
Iran	1.744251732	11.08
Iraq	1.328695183	24.3
Ireland	1.74548034	9.25625
Israel	1.547124397	9.15625

Italy	1.730249624	10.25
Jamaica	1.821339223	14.825
Japan	1.687584493	3.75625
Jordan	1.765793028	15.4
Kazakhstan	1.891684183	10.74166667
Kenya	1.884971049	9.8
Kiribati	1.504153886	2
Korea (Rep of)	1.847151175	3.46875
Kuwait	1.246474085	0.976923077
Kyrgyzstan	1.889569748	9.05
Lao People’s Democratic Republic	1.765998016	2
Latvia	1.858331029	13.32
Lebanon	1.738733486	8.2
Lesotho	1.787513238	33.3
Libya	1.122740868	30
Liechtenstein	1.687483259	1.5
Lithuania	1.954144156	14.13333333
Luxembourg	1.411484274	2.8
Macedonia, FYR	1.957062483	34.3
Madagascar	1.928587139	4.675
Malawi	1.805527326	7.8
Malaysia	1.809261078	3.364285714
Maldives	1.74778144	1.4
Mali	1.797646798	6.05
Malta	1.73903274	7.15
Marshall Islands	1.626727299	30.9
Mauritania	1.843822828	26.8
Mauritius	1.903034508	7.276923077
Mexico	1.867301807	3.6
Micronesia (Federated States of)	1.405596749	22
Monaco	1.24845117	3.6
Mongolia	1.787473945	3.94
Montenegro	1.788302197	30.3
Morocco	1.894713724	15.15333333
Mozambique	1.935198627	2.2
Myanmar	1.690035225	6
Namibia	1.783384175	20.02
Nepal	1.829937705	5.033333333
Netherlands	1.645320859	5.09375
New Zealand	1.730130956	6.9375
Nicaragua	1.937061335	11.22857143
Niger	1.636980633	3.3
Nigeria	1.460236014	21

Norway	1.58489958	4.5
Oman	1.398528881	15
Pakistan	1.97546946	5.563636364
Palau	1.485250967	4.2
Panama	1.726422971	13.64666667
Papua New Guinea	1.642148413	7.7
Paraguay	1.96578437	6.24
Peru	1.892400062	8.08125
Philippines	1.963460937	9.375
Poland	1.847892441	15.16428571
Portugal	1.757500719	5.60625
Qatar	1.214051553	2.566666667
Republic of Moldova	1.951925326	8.171428571
Romania	1.991813849	6.983333333
Russian Federation	1.89102865	9.057142857
Rwanda	1.742139143	0.45
Samoa	2.037765684	5
San Marino	1.730249625	3.575
Sao Tome and Principe	1.881845661	14.4
Saudi Arabia	1.402718251	4.675
Senegal	1.974095611	48
Serbia	1.899973731	19.65
Seychelles	1.771189082	8.566666667
Sierra Leone	1.458852171	3.4
Singapore	1.788235032	3.64
Slovakia	1.888373221	15.36153846
Slovenia	1.835216644	7.092857143
Solomon Islands	1.596047711	31.9
Somalia	1.361185017	47
South Africa	1.733344583	25.16666667
Spain	1.819784756	16.45625
Sri Lanka	2.049358906	10.63125
St. Kitts and Nevis	1.779813978	5.1
St. Lucia	1.752525117	17.475
St. Vincent	1.733827455	20.2
Sudan	1.850745237	18.2
Suriname	1.837613841	12.41
Swaziland	1.864043268	22.1
Sweden	1.660835012	6.875
Switzerland	1.687483259	3.3
Syria	1.764732902	8.76
Tajikistan	2.023269635	2.2

Tanzania	1.866733649	4.35
Thailand	1.897597762	1.906666667
Timor Leste	1.646549173	20
Togo	1.718889359	33
Tonga	1.768144854	5.975
Trinidad and Tobago	1.679807774	14.5125
Tunisia	1.935974862	15.075
Turkey	1.992815855	8.44375
Tuvalu	1.416168149	11.4
Uganda	1.871484175	2.1
Ukraine	1.954520276	9.272727273
United Arab Emirates	1.674192636	2.4
United Kingdom	1.581002512	6.8625
United States	1.544571807	5.5375
Uruguay	1.88787393	11.66875
Uzbekistan	1.980791318	1
Vanuatu	1.677429125	1.7
Venezuela	1.696938128	11.68125
Viet Nam	1.931853024	2.333333333
Yemen	1.767021021	13.025
Zambia	1.936336215	15.2
Zimbabwe	1.549642804	5.525
OUTLIERS REMOVED FROM CHART		
Liberia		85
Turkmenistan		60
Djibouti		51.5
DPRK had to be omitted due to a total lack of credible unemployment estimates.		
St. Martin		12.2

B.4 DIVERSITY: GTAP 6 DATA

Country	Diversity (Entropy Value BY 2005) GTAP 6 DATA	Steady-state Unemp (AVG 1990-2005)
Albania	2.013094892	22.7
Argentina	2.178581909	13.1438
Australia	2.140774042	7.7375
Austria	1.941567138	3.95625
Bangladesh	2.147086749	

Belgium	2.027610263	8.1
Botswana	1.974630411	19.3571
Brazil	2.176761088	7.8
Bulgaria	2.00838917	15.4308
Canada	2.132936465	8.675
China	1.97743239	3.19375
Chile	2.189401611	6.96875
Colombia	2.192359011	12.2813
Croatia	2.031791902	13.4
Cyprus	1.906983906	4.2375
Czech Republic	1.969710725	6.21429
Denmark	2.127047296	6.4625
Estonia	2.01057706	8.43125
Finland	2.05939522	10.725
France	2.032265656	10.475
Germany	1.897243479	8.51333
Greece	2.12251531	9.55625
Hungary	1.969304797	8.10714
India	2.142545695	3.41296
Indonesia	2.198587315	7.05455
Ireland	2.032059211	9.25625
Italy	1.92732603	10.25
Japan	2.04196879	3.75625
Korea (Rep of)	2.006076335	3.46875
Latvia	1.979352672	13.32
Lithuania	2.043336645	14.1333
Luxembourg	2.043388912	2.8
Madagascar	2.076764771	4.675
Malawi	1.939879018	7.8
Malaysia	1.744744873	3.36429
Malta	1.865807615	7.15
Mexico	2.030281724	3.6
Morocco	2.102639954	15.1533
Mozambique	1.930428668	2.2
Netherlands	2.079640731	5.09375
New Zealand	2.163915382	6.9375
Peru	2.148755388	8.08125
Philippines	2.151964589	9.375
Poland	2.0657391	15.1643
Portugal	2.016112159	5.60625
Russian Federation	2.176884971	9.05714
Singapore	1.769660441	3.64
Slovakia	1.975399982	15.3615

Slovenia	1.98730265	7.09286
South Africa	2.165316746	25.1667
Spain	2.07525232	16.4563
Sri Lanka	2.055138049	10.6313
Sweden	1.927583812	6.875
Switzerland	2.016528281	3.3
Tanzania	2.025495005	4.35
Thailand	2.009453459	1.90667
Tunisia	2.090642988	15.075
Turkey	2.043710549	8.44375
Uganda	1.91426445	2.1
United Kingdom	2.015674748	6.8625
United States	2.009799579	5.5375
Uruguay	2.196585158	11.6688
Venezuela	2.099716597	11.6813
Viet Nam	2.207086583	2.33333
Zambia	2.126774948	15.2
Zimbabwe	2.15038121	5.525

B.5 DIVERSITY: GTAP 4 DATA

Country	Diversity (Entropy Value 1994 GTAP 4)	Steady-state Unemp (AVG 1990-2005)
Argentina	3.204268107	13.14375
Australia	2.80673059	7.7375
Brazil	3.193413291	7.8
Canada	2.965952041	8.675
China	3.337049336	3.19375
Chile	3.056161099	6.96875
Colombia	3.242547943	12.28125
Denmark	2.748539598	6.4625
Finland	2.84480625	10.725
Germany	2.845254576	8.513333333
India	3.3550029	3.412958427
Indonesia	3.256737043	7.054545455
Japan	2.778457986	3.75625
Korea (Rep of)	3.154528118	3.46875
Malaysia	3.209751148	3.364285714
Mexico	3.073098044	3.6
Morocco	3.124802273	15.15333333

New Zealand	2.922654952	6.9375
Philippines	3.177796275	9.375
Russia	3.089225118	9.057142857
Singapore	2.493610628	3.64
South Africa	2.975432985	25.16666667
Sri Lanka	2.968432481	10.63125
Sweden	2.851552972	6.875
Thailand	3.22256409	1.906666667
Turkey	2.98200806	8.44375
United Kingdom	2.720267699	6.8625
United States	2.783844108	5.5375
Uruguay	3.039952004	11.66875
Venezuela	2.95278544	11.68125
Viet Nam	3.156226804	2.333333333

B.6 DIVERSITY: OECD DATA

Country	Diversity (Entropy Value 2002) OECD Data	Steady-state Unemp (AVG 1990-2005)
Australia	3.21070105	7.7375
Brazil	3.08581657	7.8
Canada	3.23247459	8.675
China	3.230279581	3.19375
Czech Republic	3.303901563	6.214285714
Denmark	3.171512103	6.4625
Finland	3.226271869	10.725
France	3.357545987	10.475
Germany	3.249284417	8.513333333
Greece	2.99285915	9.55625
Hungary	3.282796173	8.107142857
Italy	3.297778479	10.25
Japan	3.336974996	3.75625
Korea (Rep of)	3.395635071	3.46875
Netherlands	3.20281609	5.09375
Norway	3.117480713	4.5
Poland	3.159466572	15.16428571
Spain	3.263331537	16.45625
United Kingdom	3.291309989	6.8625
United States	3.254493176	5.5375

B.7 CATO TRADE OPENNESS INDEX VALUES

Country	Trade Openness Index (CATO 1998)
Albania	4
Algeria	2.8
Argentina	7.3
Australia	7.9
Austria	8
Bahrain	6.3
Bangladesh	3.8
Barbados	4.6
Belgium	9
Belize	5.7
Bolivia	7.8
Botswana	7.1
Brazil	4.7
Bulgaria	7.1
Burundi	2.3
Cameroon	5.2
Canada	7.5
Central African Republic	4.3
Chile	6.8
Colombia	6
Congo (Republic of the)	7
Costa Rica	8.3
Côte d'Ivoire	5.9
Croatia	3.9
Cyprus	5.1
Czech Republic	8.3
Denmark	7.9
Dominican Republic	6.9
Ecuador	7.1
Egypt	6.3
El Salvador	6.6
Estonia	9.4
Fiji	6.1
Finland	7.8

France	7.2
Germany	8.6
Greece	7
Guatemala	7
Honduras	7.4
Hungary	7
Iceland	6.8
Indonesia	6.2
Iran	1.7
Ireland	8.7
Israel	7.9
Italy	8.3
Jamaica	6.5
Japan	6.5
Jordan	6.5
Kenya	7
Korea (Rep of)	8.3
Kuwait	6.3
Latvia	7.1
Lithuania	8
Luxembourg	8.4
Madagascar	5.1
Malawi	5.1
Malaysia	7.1
Mali	5.2
Malta	6
Mauritius	7.1
Mexico	7.9
Morocco	5.4
Myanmar	0
Namibia	7.1
New Zealand	7.8
Nicaragua	8.2
Niger	4.6
Norway	7.5
Oman	6.6
Pakistan	4.9
Palau	8
Papua New Guinea	3.5
Paraguay	7.8
Peru	7.5
Philippines	8.1
Poland	6.4

Portugal	7.8
Romania	4.5
Russian Federation	4.9
Senegal	4.8
Sierra Leone	1.3
Singapore	10
Slovenia	6.3
South Africa	6.6
Spain	8.1
Sri Lanka	6
Sweden	8.2
Switzerland	8.1
Syria	3.3
Tanzania	4.2
Thailand	7.2
Trinidad and Tobago	6.6
Tunisia	5.6
Turkey	5.8
Uganda	6.3
United Kingdom	8.4
United States	7.7
Uruguay	7.4
Venezuela	6.6
Zambia	7.1
Zimbabwe	5.6

B.8 CAPITAL RATIO: GTAP 6 DATA

Country	Capital Ratio: GTAP 6
Portugal	0.420586732
Croatia	0.44027938
Sweden	0.445512531
Denmark	0.526304666
Luxembourg	0.538858291
Slovenia	0.550041344
Belgium	0.56376045
Switzerland	0.573666806
United Kingdom	0.575653754

Greece	0.603248162
United States	0.609486665
Estonia	0.618253472
Japan	0.631788457
Colombia	0.651115142
Australia	0.687352909
Canada	0.68822866
Ireland	0.701516004
Latvia	0.711991493
South Africa	0.712703156
Netherlands	0.741538288
Morocco	0.745061444
Brazil	0.755052466
Finland	0.770489954
Madagascar	0.77987713
Uganda	0.781795668
Germany	0.797635213
Argentina	0.798431457
Botswana	0.800763698
China	0.813071576
Malawi	0.816292154
Zimbabwe	0.868311047
Spain	0.882982106
Poland	0.911542171
Lithuania	0.943184316
Bangladesh	0.946514757
New Zealand	0.952031474
Turkey	0.95389609
Malta	0.956875984
Russian Federation	0.967068923
Sri Lanka	0.971199411
Malaysia	0.992195515
Mozambique	0.994983935
Korea (Rep of)	1.006954627
France	1.011270855
Bulgaria	1.021444923
Zambia	1.031741204
Tunisia	1.038590503
Tanzania	1.040554163
Austria	1.044310579
Singapore	1.044797459

Czech Republic	1.051448218
Hungary	1.106700683
Italy	1.141145421
India	1.208810921
Albania	1.274204488
Slovakia	1.287310813
Chile	1.425633454
Viet Nam	1.429985658
Venezuela	1.455960012
Uruguay	1.608295247
Philippines	1.97591766
Cyprus	1.982654942
Peru	2.042236155
Indonesia	2.084361877
Mexico	2.121486135
World	0.729164644

B.9 ANNUAL UNEMPLOYMENT RATE VARIANCE: WORLD BANK DATA

Country	VAR 1985-2005 (WB Data)	Steady-state Unemp (AVG 1990-2005)
Algeria	17.39917582	23.56923077
Antigua and Barbuda	2.88	7.2
Argentina	23.93447619	13.14375
Armenia	0.125	36.15
Australia	2.706	7.7375
Austria	0.293333333	3.95625
Azerbaijan	20.22333333	11.13333333
Bahamas	4.616176471	10.54285714
Bahrain	0.32	5.9
Bangladesh	1.825714286	3.26
Barbados	24.49590476	14.6625
Belgium	2.33347619	8.1
Belize	8.358	11
Benin	0.43	1.1
Bhutan	0.49	2.5
Bolivia	48.7725731	5.878571429
Botswana	15.58857143	19.35714286
Brazil	6.943529412	7.8
Bulgaria	12.19897436	15.43076923

Burkina Faso	0.49	2.5
Cambodia	0.43	2.4
Cameroon	0.18	7.8
Canada	2.155904762	8.675
Cayman Islands	3.47969697	5.416666667
Chile	4.302333333	6.96875
China	0.595142857	3.19375
Colombia	8.890571429	12.28125
Costa Rica	0.900571429	5.55
Côte d'Ivoire	2.253333333	4.966666667
Croatia	9.644	13.4
Cuba	5.552727273	4.945454545
Cyprus	1.325535714	4.2375
Czech Republic	4.792087912	6.214285714
Denmark	3.223333333	6.4625
Djibouti	128	51.5
Dominica	30.315	14.925
Dominican Republic	4.604952381	16.80666667
Ecuador	4.155065359	8.88
Egypt	1.641911765	9.6875
El Salvador	5.191868421	7.60625
Estonia	16.26220588	8.43125
Ethiopia	75.867	8.22
Fiji	2.416318681	5.522222222
Finland	16.98361905	10.725
France	1.942904762	10.475
Georgia	1.842857143	12.6
Germany	1.90552381	8.513333333
Ghana	10.29	8.4
Greece	1.990619048	9.55625
Grenada	49.04666667	17.3
Guatemala	0.709821429	2.266666667
Guyana	2.809166667	10.86666667
Haiti	72.43	9.95
Honduras	5.041318681	4.223076923
Hungary	4.571483516	8.107142857
Iceland	1.215428571	3.44
India	0.959429273	3.412958427
Indonesia	9.209238095	7.054545455
Iran	3.328	11.08
Iraq	30.19	24.3
Ireland	30.41461905	9.25625
Israel	2.506619048	9.15625

Italy	1.650619048	10.25
Jamaica	12.18428571	14.825
Japan	1.295619048	3.75625
Jordan	4.4725	15.4
Kazakhstan	5.146287879	10.74166667
Korea (Rep of)	1.64947619	3.46875
Kuwait	0.233406593	0.976923077
Kyrgyzstan	3.559	9.05
Lao People's Democratic Republic	0.72	2
Latvia	10.03511111	13.32
Lebanon	0.18	8.2
Lesotho	216.9633333	33.3
Lithuania	6.98969697	14.13333333
Luxembourg	0.885619048	2.8
Macedonia, FYR	6.79	34.3
Madagascar	2.0225	4.675
Malaysia	3.413157895	3.364285714
Maldives	0.72	1.4
Mali	15.125	6.05
Malta	0.199	7.15
Marshall Islands	169.28	30.9
Mauritania	38.77333333	26.8
Mauritius	5.403589744	7.276923077
Mexico	1.350291667	3.6
Mongolia	1.213	3.94
Morocco	9.83124183	15.15333333
Namibia	1.327	20.02
Nepal	12.46333333	5.033333333
Netherlands	6.201052632	5.09375
New Zealand	4.384710526	6.9375
Nicaragua	16.19263158	11.22857143
Niger	6.48	3.3
Norway	1.418904762	4.5
Pakistan	2.852666667	5.563636364
Panama	2.898394737	13.64666667
Paraguay	2.577342105	6.24
Peru	1.881437908	8.08125
Philippines	2.591333333	9.375
Poland	10.20093407	15.16428571
Portugal	2.263619048	5.60625
Qatar	1.493333333	2.566666667
Republic of Moldova	2.019047619	8.171428571
Romania	0.843333333	6.983333333

Russian Federation	5.848791209	9.057142857
Rwanda	0.063333333	0.45
San Marino	1.678076923	3.575
Saudi Arabia	0.1425	4.675
Serbia	2.645	19.65
Seychelles	40.9625	8.566666667
Singapore	2.200421053	3.64
Slovakia	8.804230769	15.36153846
Slovenia	0.608406593	7.092857143
South Africa	18.81878788	25.16666667
Spain	20.38190476	16.45625
Sri Lanka	7.012426471	10.63125
St. Lucia	16.74931818	17.475
Suriname	11.78265152	12.41
Swaziland	14.24333333	22.1
Sweden	8.46147619	6.875
Switzerland	0.64	3.3
Syria	12.13090909	8.76
Tanzania	1.125	4.35
Thailand	1.436842105	1.906666667
Tonga	26.5425	5.975
Trinidad and Tobago	25.89047619	14.5125
Tunisia	0.673611111	15.075
Turkey	2.198304094	8.44375
Tuvalu	48.02	11.4
Uganda	2.42	2.1
Ukraine	3.890181818	9.272727273
United Arab Emirates	0.43	2.4
United Kingdom	5.355904762	6.8625
United States	0.96347619	5.5375
Uruguay	7.429571429	11.66875
Venezuela	7.993904762	11.68125
Viet Nam	0.105	2.333333333
Yemen	14.72916667	13.025
Zambia	10.2447619	15.2
Zimbabwe	1.598	5.525

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